

FIVE-YEAR REVIEW REPORT

FIRST FIVE YEAR REVIEW REPORT FOR WHITE KING LUCKY LASS MINES SITE

LAKEVIEW, OREGON

MAY 2010

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Table of Contents

EXECUTIVE SUMMARY.....	vii
FIVE-YEAR REVIEW SUMMARY FORM.....	viii
1 INTRODUCTION.....	1-1
2 SITE CHRONOLOGY.....	2-1
3 SITE BACKGROUND AND REMEDIAL ACTION ACTIVITES	3-1
3.1 Summary of Site Contamination	3-3
3.2 Record of Decision Summary	3-5
3.3 Explanation of Significant Differences Summary.....	3-6
3.4 Final Remedial Action	3-7
3.5 Remedial Activities	3-7
3.5.1 Chronology of Remedial Action Construction	3-8
3.5.2 Design Change Notices.....	3-11
3.5.3 Remedial Action Construction Costs.....	3-12
3.5.4 Present and Anticipated Future Site Use	3-12
4 PROGRESS SINCE COMPLETION OF REMEDIAL ACTION.....	4-1
4.1 Institutional Controls.....	4-1
4.2 Long Term Monitoring and O&M Activities.....	4-2
4.2.1 Inspection and Maintenance	4-3
4.2.2 White King Pond.....	4-4
4.2.2.1 pH Monitoring	4-4
4.2.2.2 Habitat Monitoring in White King Pond	4-5
4.2.3 Augur Creek.....	4-5
5 FIVE-YEAR REVIEW PROCESS.....	5-6
5.1 Document and Data Review.....	5-7
5.2 Site Inspection	5-7
5.3 Interviews.....	5-8
6 TECHNICAL ASSESSMENT.....	6-8
6.1 Question A:	6-8
6.1.1 Stockpile Inspection and Maintenance	6-8
6.1.2 Groundwater Monitoring	6-10
6.1.3 White King Pond pH Monitoring and Neutralization.....	6-10
6.1.4 White King Pond Biological Monitoring.....	6-11
6.1.5 Institutional Controls	6-11
6.1.5.1 Fence Inspection and Maintenance.....	6-12

6.1.5.2	Legal/Regulatory Controls.....	6-13
6.1.6	Early Indicators of Potential Issues.....	6-13
6.2	Question B:	6-13
6.3	Question C	6-15
6.4	Technical Assessment Summary	6-15
7	<i>ISSUES.....</i>	<i>7-1</i>
8	<i>RECOMMENDATIONS AND FOLLOW-UP ACTIONS</i>	<i>8-1</i>
9	<i>PROTECTIVENESS STATEMENT</i>	<i>9-1</i>
10	<i>NEXT REVIEW</i>	<i>10-1</i>
11	<i>References</i>	<i>11-1</i>

List of Tables

Table 2-1: Chronology of Significant Events	2-1
Table 3-1: Summary of Cancer Risks and Hazard Indices for Soil at the Mines Site	3-4
Table 7-1: MINES SITE Issues	7-1
Table 8-1: Summary of Recommendations and Follow-Up Actions.....	8-1

List of Figures

- Figure 1: Project Location Map
- Figure 2: Site Location Map
- Figure 3: White King Annual Inspection Items Map
- Figure 4: Lucky Lass Annual Inspection Items
- Figure 5: Property Ownership Map

List of Attachments

- Attachment 1: LIST OF DOCUMENTS REVIEWED
- Attachment 2: 2009 Groundwater Monitoring Report
- Attachment 3: SITE INSPECTION FORM
- Attachment 4: TITLE SEARCH REPORT

Acronyms and Abbreviations

AEC	Atomic Energy Commission
AWQC	Federal Ambient Water Quality Criteria
ARAR	applicable or relevant and appropriate requirement
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
CQA	Construction Quality Assurance
DEIS – RI/FS	Draft Environmental Impact Statement – Remedial Investigation/Feasibility Study
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	feasibility study
GCL	geosynthetic clay liner
HI	Hazard Index
IC	institutional control
LTM	long term monitoring
MCL	maximum contaminant level
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	operations and maintenance
ODEQ	Oregon Department of Environmental Quality
ODE	Oregon Office of Energy
OMMP	Operations, Maintenance and Monitoring Plan
PRP	Potentially Responsible Party

Acronyms and Abbreviations (continued)

RA	remedial action
RAO	remedial action objective
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
ROD	Record of Decision
RPM	Remedial Project Manager
RPO	Remedial Process Optimization
SARA	Superfund Amendments and Reauthorization Act
USFS	U.S. Department of Agriculture Forest Service
UMTRCA	Uranium Mill Tailings Radiation Control Act

EXECUTIVE SUMMARY

This document summarizes the first five-year review for the White King/Lucky Lass Mines Site located near Lakeview, Oregon. The results of the five-year review indicate that the remedies described in the September 2001 Record of Decision (ROD) and revised by an Explanation of Significant Differences (ESD) in 2006 are protective of human health and the environment. Overall, the remedial actions (RAs) are functioning as designed, and no deficiencies were identified that impact the protectiveness of the remedies. The protectiveness of the RAs is being verified by the Operations, Maintenance and Monitoring Plan (OMMP) which monitors groundwater concentrations of selected contaminants of concern (COC) and maintains the mine waste repository cap surface and slopes.

Based on the monitoring data and operations and maintenance information, informal interviews with federal and state remedial project managers (RPMs), and the observed integrity of the cap structure, the remedies continue to remain protective. The ROD and ESD-prescribed RAs continue to contain contaminants, and there have been no changes in the physical conditions of the site that affect protectiveness.

The review of documents, applicable or relevant and appropriate requirements (ARARs), and exposure assumptions indicates that the remedial actions implemented at the White King/Lucky Lass Mines Site are functioning as intended in the ROD and ESD and meet the intent of the ROD and the ESD. The following five-year review form presents the summary of this review.

The remedial actions at the Site are complete and protective of human health and the environment. Long-term protectiveness of the RAs will continue to be ensured and verified by Institutional Controls (ICs), LTM and O&M program, which includes monitoring of groundwater COC concentrations and inspection and maintenance of the integrity of the White King Consolidated stockpile and Lucky Lass stockpile caps and fences.

The **Human Exposure Environmental Indicator** Status for the Site remains “Under Control”. The Consolidated Stockpile has been capped, there has been only minimal erosion near the stockpile and no one is using groundwater at the site.

The **Groundwater Migration Environmental Indicator** Status for the Site remains “Under Control” because the groundwater contaminant levels have not statistically changed from the previous sampling efforts and continue to meet both RAOs.

Cross Program Revitalization Measure Status: The Site is “Ready for Anticipated Use”.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name (<i>from WasteLAN</i>): White King/Lucky Lass		
EPA ID (<i>from WasteLAN</i>): OR7122307658.		
Region: 10	State: OR	City/County: Lakeview, Lake
SITE STATUS		
NPL status: Final <input checked="" type="checkbox"/> Deleted Other (specify)		
Remediation status (choose all that apply): Under Construction Operating <input checked="" type="checkbox"/> Complete		
Multiple OUs?* YES <input checked="" type="checkbox"/> NO	Construction completion date: September 2006	
Has site been put into reuse? <input checked="" type="checkbox"/> YES NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA State Tribe Other Federal Agency:		
Author name: Environmental Protection Agency		
Review period: February, 2010 to May, 2010		
Date(s) of site inspection: August 4, 2009		
Type of review: <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <div style="text-align: center;"> <input checked="" type="checkbox"/> Post-SARA Non-NPL Remedial Action Site Regional Discretion </div> <div style="text-align: center;"> Pre-SARA </div> <div style="text-align: center;"> NPL-Removal only NPL State/Tribe-lead </div> </div>		
Review number: <input checked="" type="checkbox"/> 1 (first) 2 (second) 3 (third) Other (specify)		
Triggering action: <div style="margin-top: 10px;"> <input checked="" type="checkbox"/> Actual RA On-site Construction Start Date: May 18, 2005 Construction Completion September 2006 Previous Five-Year Review Report Other (specify) </div>		
Triggering action date: Construction Start May 18, 2005		
Due date (<i>five years after triggering action date</i>): May 18, 2010		

FIVE-YEAR REVIEW SUMMARY FORM (continued)

ISSUES	
Continued Neutralization of the White King Pond on approximately a five year interval in order to maintain stable pH.	
RECOMMENDATIONS AND FOLLOW-UP ACTIONS	
Issue	Recommendation and Follow-Up Actions
Continued Neutralization of the White King Pond on approximately a five year interval in order to maintain stable pH.	Work with the PRPs and/or the settlement from the Tronox bankruptcy to ensure that funding remains available for periodic pond neutralization and that neutralization is performed.
PROTECTIVENESS STATEMENT	
The remedial actions at the site are complete and protective of human health and the environment. Based upon the review of relevant documents and the site inspection, the remedy is functioning as intended by the ROD and ESD. There have been no changes in the physical condition of the site that would affect the protectiveness of the remedy. Long-term protectiveness of the RA will continue to be ensured and be verified by Institutional Controls (ICs), LTM and the O&M program, which monitors groundwater COC concentrations and inspects and maintains the integrity of the cap and fences.	
OTHER COMMENTS	
The Superfund Long-Term Human Exposure Environmental Indicator Status for the White King/Lucky Lass Site remains "Under Control and Protective Remedy In Place" because the site is Construction Complete, the remedy is operating as intended, and the required engineering and institutional controls are in place and effective.	
The Groundwater Migration Environmental Indicator Status for the Mines sites remains "Under Control" because Groundwater contaminant levels from 2009 are not statistically significant from previous sampling efforts and are below the RAOs for drinking water and AWQC in order to be protective of surface water. Institutional controls are in place to prevent the installation of drinking water wells within the footprint of the White King Consolidated repository.	
Cross Program Revitalization Measure Status: The Site was designated "Ready for Anticipated Use" in 2006 because all remedial actions are complete and all required institutional controls are in place and effective. The Site is in reuse for agricultural purposes with the exception of the consolidated stockpiles.	

1 INTRODUCTION

This document presents the first five-year review for the White King/Lucky Lass Mines Site (the Mines Site) located near Lakeview, Oregon. The purpose of a five-year review is to determine whether the remedy at a site remains protective of human health and the environment. The methods, findings, and conclusions of the review are documented in this five-year review report. In addition, this report identifies issues found during the review and provides recommendations to address them. Figure 1 presents the site vicinity map. The Site consists of one Operable Unit; therefore, this five-year review covers site-wide conditions.

This five-year review report was prepared pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The NCP in 40 Code of Federal Regulations (CFR) §300.430(f)(4)(ii) further states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Environmental Protection Agency (EPA), Region 10 is the lead agency for this National Priorities List (NPL) site and has conducted this five-year review in accordance with existing five-year review guidance (EPA, 2001). The Forest Service, Oregon Department of Energy, and Oregon Department of Environmental Quality (ODEQ) are the respective federal and state support agencies and have assisted with this review. This is the first five-year review for the Mines Site. The triggering action used for this statutory review is the actual remedial action construction start date of May 18, 2005. The five-year review at the Mines Site is required because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure. At the time of this five-year review, full implementation of the site remedy has been completed. The Institutional Controls (ICs) outlined in the ROD and ESD have been implemented. The final Construction Completion Report was completed in May 2007.

All available information pertaining to the Site has been reviewed during the performance of this five-year review, including, but not limited to, the Remedial Investigation (RI) (Weston, 1997a) and a Feasibility Study (FS) (Weston, 1999), the ESD (EPA, 2006), the Completion Report (Golder, 2007), the Operations, Maintenance, and Monitoring Plan (Golder, 2005e) various annual groundwater monitoring reports (Golder 2008; Golder 2009a; Golder 2010), and other correspondence with the various parties involved with the response actions. The principal documents used in preparing this report are referenced in Section 11.

2 SITE CHRONOLOGY

Table 2-1 summarizes significant events and documents from the time the Mines Site was first identified through 2009. Recurring activities, such as post-RA long-term groundwater monitoring and site O&M activities, are also presented in Table 2-1. Figure 2 presents the Mines Site location map.

Table 2-1: Chronology of Significant Events

Event	Date
<i>Draft Environmental Impact Statement Remedial Investigation/Feasibility Study for the Cleanup and Rehabilitation of the White King and Lucky Lass Uranium Mines (DEIS)</i> was prepared by/for the USFS in August 1991, and a revised DEIS was issued in 1994.	1991
Property is listed on the NPL.	1995
Administrative Order on Consent with Kerr McGee Corporation, Fremont Lumber, and Phelps Dodge	1995
RI Report is completed.	1997
Pond Neutralization Study Conducted	1998
FS is conducted to evaluate remedial alternatives.	1999
A remedy for the site is selected and a ROD is signed.	2001
United States Department of Health and Human Services Public Health Assessment report is issued, concluding that the site no longer poses a public health hazard and that contaminants are contained on site.	2002
Remedial Action Work Plan is completed.	2005
ESD Completed to document changes in the site remedial technical basis and specific remedial goals	2006
Remedial Action Conducted	2005-2006
Preliminary Close-out Report	2006
Remedial Action Construction Completion Report	2007
Groundwater monitoring, site inspections, and O&M are conducted.	2004-2009

3 SITE BACKGROUND AND REMEDIAL ACTION ACTIVITIES

This section presents background information and describes the remedial activities conducted at the Mines Site.

Site Location and History

The Mines site is located in south-central Oregon, approximately 17 miles northwest of Lakeview, Oregon (Figure 1). The Site consists of two former uranium mines located within one mile of each other, the White King Mine and the Lucky Lass Mine, which collectively encompass approximately 140 acres (Figure 2). Portions of the Site are within the Fremont National Forest, managed by the United States Forest Service (USFS), and portions are on private lands owned by Fremont Lumber and the Coppin family trust. See Figure 5 for a property map at the Site. The majority of the White King consolidated stockpile and all of the Lucky Lass site are on National Forest lands.

Both Mines have had several operators, mineral claims holders, lease holders, and property owners. Mining began at the Mines Site in 1955. Initial mining at White King was underground via mine shafts developed up to 312 feet below the surface. In 1959, due to problems with infiltration of water, underground mining was abandoned for open-pit mining techniques, which were used until active mining stopped around 1965. Open-pit mining techniques were used at the Lucky Lass Mine from the beginning of operations.

An extensive exploratory drilling program was carried on at both mines through 1979. Since then, little mining or exploration activity has taken place on these claims. Available records indicate that the White King Mine produced about 138,146 tons of ore and Lucky Lass produced about 5,450 tons of ore during their periods of operation. A total of 140 acres have been disturbed by mining, 120 acres at the White King Mine and 20 acres at the Lucky Lass Mine. Disturbance included stockpiling of ore, overburden, and the water-filled White King and Lucky Lass mine pits.

Prior to remedial action, major features at the White King Mine included the White King Pond (formed when water collected in the open-pit mine), the “Protore Stockpile,” and the “Overburden Stockpile.” Both stockpiles consisted of overburden material and contained a

combined volume of almost one million cubic yards (CY). The pit pond occupies approximately 13 acres and contains approximately 80 million gallons of water.

Augur Creek runs southward through the eastern side of the White King area and receives discharge from the White King Pond.

Major features at the Lucky Lass Mine include the Lucky Lass Pond and the associated overburden stockpile. This pond covers approximately 5 acres. The Lucky Lass Stockpile covers approximately 14 acres and contains approximately 260,000 CY of material.

A Draft Environmental Impact Statement Remedial Investigation/Feasibility Study for the Cleanup and Rehabilitation of the White King and Lucky Lass Uranium Mines (DEIS) was prepared by/for the USFS in August 1991, and a revised DEIS was issued in 1994. Upon review of the 1994 DEIS-RI/FS Report, EPA determined that further investigation and analysis of remedial alternatives was needed to support a remedial action decision under CERCLA. Kerr-McGee Corporation conducted a Remedial Investigation (RI) and a Feasibility Study (FS) pursuant to an Administrative Order on Consent. The RI Report was finalized in 1997 (Weston 1997) and the FS Report was finalized in 1999 (Weston 1999). EPA then issued a Record of Decision (ROD) for the Site in 2001 (EPA 2001).

Subsequent to the ROD, a group of Potentially Responsible Parties (PRPs) agreed to take primary responsibility for implementing remedial action and specified post-remediation monitoring at the Site in accordance with a Consent Decree (effective date January 20, 2006). The PRPs retained Golder Associates Inc. (Golder) to perform remedial design, construction management, and construction quality assurance (CQA) monitoring for the remedial action.

Golder prepared the following reports for the PRPs in preparation for remedial action:

- Remedial Design Workplan (Golder 2004a)
- Geotechnical Investigation Report (Golder 2004b)
- Gamma Radiation Survey Report (Golder 2004c)
- Workplan for 2004 Preparatory Field Activities (Golder 2004d)

- White King Pond and Augur Creek Study Workplan (Golder 2004e)
- Remedial Design Report (Golder 2005a)
- Construction Quality Assurance Plan (Golder 2005b)
- Field Sampling Plan (Golder 2005c)
- Water Quality Monitoring Plan (Golder 2005d)
- Operations, Maintenance, and Monitoring Plan (Golder 2005e)
- Site Health and Safety Plan for Remedial Action (Golder 2005f)
- Quality Assurance Project Plan for Soil, Sediment, and Surface Water Monitoring (Golder 2005g)
- Remedial Action Workplan (Golder 2005h)
- Construction Completion Report (Golder, 2007)

In addition to implementing the remedy, the PRPs agreed to perform a Supplemental Environmental Project (SEP), which is documented in a separate report (Golder 2006b). The SEP consisted of creating wetland areas in the White King meadow and was constructed in conjunction with remedial action construction.

The PRPs also performed a study of the White King Pond and Augur Creek, as documented in the Report on White King Pond and Augur Creek Study (Golder 2006a).

3.1 Summary of Site Contamination

The primary constituents of concern (COCs) for the Site are uranium isotopes and radium (Ra-226). Arsenic is a COC for the White King portion of the Site, but not for the Lucky Lass portion of the Site.

Site Risks

An evaluation of the potential risks to human health and the environment from site contaminants was conducted and is discussed in the ROD. The objectives of the risk assessment were to:

- Identify COCs for human health and ecological risk;
- Provide a basis for determining residual chemical levels that are adequately protective of human health and the environment;
- Help determine if response actions are necessary at the Site; and
- Provide a basis for comparing the various remedial alternatives and potential effects on human health.

Table 3-1 presents the site risks. The risk assessment concluded that hazardous substances were present on the site and that the actual or threatened release of these substances may present an imminent and substantial endangerment to public health, welfare or the environment if a response action is not taken.

Table 3-1: Summary of Cancer Risks and Hazard Indices for Soil at the Mines Site

	Cancer Risks	Hazard Indices
Exposure Scenario	RME	
Future On-Site Resident	3×10^{-1}	2×10^3
Future Recreational User (child)	4×10^{-4}	11
Future On-Site Worker	2×10^{-4}	Below 1

Notes: RME = Reasonable Maximum Exposure

Hazard Indices = Summation of all Hazard Quotients for each COC

The primary drivers for carcinogenic and noncarcinogenic risks were ingestion of arsenic in soil and shallow groundwater and exposure to radiation from radium-226 in soil. The predominant risks from groundwater were associated with selected wells within the overburden stockpile.

The ecological risk assessment was conducted under a tiered or phased approach. The assessment showed some adverse impact, based on screening level assessment only for selected terrestrial receptors and plants exposed to non-radionuclides such as arsenic, selenium antimony in surface and subsurface soils at the White King mine. The risk assessment also predicted adverse impact, based on screening level assessment only, for aquatic invertebrates exposed to non-radionuclide COCs in the sediments of the White King pond and Augur Creek. The ROD recommended further evaluation of the potential adverse impacts to aquatic biota in the White King pond sediment (arsenic only) and Augur Creek sediment (arsenic and manganese).

3.2 Record of Decision Summary

The ROD for the Site listed remedial action objectives (RAOs) for both the White King and Lucky Lass areas (see ROD Section 8.2). To meet the RAOs in the ROD, the remedial action included the following major components:

- Re-contouring the White King Protore Stockpile so that it is no longer within the Auger Creek 500-year floodplain.
- Removal of designated soils from the White King Mine haul road and certain “off-pile” areas where there was mine-related waste above Site remediation levels, and placement of these materials on the regraded Protore Stockpile, referred to in the design documents as the Consolidated Stockpile.
- Excavation of the White King Overburden Stockpile and placement of the material on the Consolidated Stockpile.
- Placement of 20 inches of cover soil and 4 inches of a topsoil / armor gravel mixture on the Consolidated Stockpile surface sufficient to support vegetation, and seeding of the stockpile surface.
- Placement of 3 inches of topsoil and reseeded of those areas where soil has been removed.
- Installation of fencing and warning signs around the Consolidated Stockpile to physically inhibit access.
- Land use restrictions to prevent undesirable uses.
- Restrictions to use of Site groundwater for drinking water.
- The ROD anticipated that the material remaining exposed at the Lucky Lass Stockpile would be below the Lucky Lass remediation level. However, the results of a gamma radiation survey of this stockpile indicated that achieving the remediation level solely by removal would involve much more material than the 3,000 cy anticipated in the ROD. As documented in Section 2, “off-pile” material was consolidated in the Lucky Lass Stockpile, and the stockpile covered with clean soil. The EPA prepared an Explanation of Significant Difference (ESD) to address this change, which is summarized in Section 1.3 below.
- Groundwater and surface water monitoring.

Radium-226 (Ra-226) was determined in the ROD to be an indicator parameter for the Site (i.e., if the cleanup levels for Ra-226 are achieved, then the cleanup levels for all constituents of

concern are achieved). Different cleanup levels were established for the White King and Lucky Lass Mines based on background concentrations in each area.

No remedial action construction was required for the White King Pond. As stated in the ROD (Section 12.1.2, p. 12-2): “The selected remedy for the White King pond is continued in-situ neutralization. This conclusion was based on the 1998 neutralization study, which demonstrated that it was possible to raise the pH in the pond through treatment which could allow eventual establishment of a diverse aquatic habitat.” This remedy component is addressed in the Operations, Maintenance, and Monitoring Plan (OMMP).

For Augur Creek, the ROD did not require any remedial action. Augur Creek monitoring was included in the OMMP as part of monitoring the effectiveness of stockpile remedial action.

The ROD stated (p. 4-1) that “... sediment cleanup is not warranted at this time. A sediment cleanup action, if determined necessary, will be documented in a future ESD or ROD amendment.” The results of the *Report on White King Pond and Augur Creek Study* (Golder 2006a), approved by EPA, demonstrated that no remedial action is required for White King Pond.

3.3 Explanation of Significant Differences Summary

In June 2006 EPA formally documented and approved changes to the ROD in an ESD. There were two primary technical changes to the remedy included in the ESD:

1. During the course of construction of the selected remedy at the Lucky Lass stockpile, a greater volume of contaminated material near the surface was identified. The ESD provided for additional grading and cover of this area to achieve the cleanup goals rather than removal of all material above cleanup levels as described in the ROD.
2. During the course of construction of the selected remedy at the Lucky Lass stockpile, construction equipment was unable to access the off-pile area near the toe of the Lucky Lass Stockpile. These materials were covered in place rather than removed as described in the ROD.

Inspections and maintenance of the Lucky Lass stockpile, in accordance with the Inspection and Maintenance plan for the White King mine waste repository, are required, since constituents of concern above cleanup levels remain at the Lucky Lass stockpile.

These modifications maintain the protectiveness of the remedy and meet RAOs.

3.4 Final Remedial Action

Upon finalization of the ESD, a detailed work plan for implementation of the RA was developed by Golder Associates on behalf of the PRPs. The final RA Work Plan was issued on April 15, 2005.

Remedial activities completed by the PRPs are discussed below.

3.5 Remedial Activities

Remediation construction at the Site was completed by Envirocon Inc. (Envirocon) of Missoula, Montana in accordance with the requirements of the project plans and specifications.

Conventional earthwork construction equipment and methods were used to complete the remedial construction. Envirocon performed its own construction quality control during the project. Land surveying was performed by Envirocon and by Anderson Engineering & Surveying, Inc. (Anderson) of Lakeview, Oregon. Gamma radiation surveying was primarily performed by Anderson personnel, supplemented as needed by Golder personnel. Construction management and CQA for the remedial actions were performed by Golder personnel.

Routine quality control during construction (i.e., in addition to the CQA provided by Golder) was provided by the Envirocon superintendent and surveyors. The superintendent performed oversight and directed construction activities. The surveyor performed survey staking to establish layout to enable the contractor to achieve the dimensions, lines, grades, and tolerances; and to complete construction in accordance with the construction drawings. The Envirocon surveyor also completed pre- and post-construction topographic surveys and the survey for as-built drawings.

3.5.1 Chronology of Remedial Action Construction

Remediation construction was performed during the 2005 and 2006 summer construction seasons. The 2005 construction season was started in early June and was curtailed in late October due to winter weather conditions. Construction activities during the 2006 season were started in early July, and all construction remediation activities were substantially completed in early November 2006.

Mobilization of personnel and equipment occurred over a few weeks at the beginning of each construction season. Preliminary site preparation was completed at the beginning of the 2005 season and included such activities as the installation of sediment and erosion control measures, clearing of the Overburden Stockpile, development of the Gravel Borrow Area, and development of temporary haul roads.

Remediation construction activities were concentrated primarily at the White King Mine Site during the 2005 construction season. Consolidating “black rock” material was the only significant construction activity completed at the Lucky Lass Site during 2005. This material had an elevated radium-226 activity than the lower activity chalk-colored overburden. Mobilization occurred in mid-June and excavation of off-pile areas started in late June.

The 2005 remediation construction activities consisted of the following:

- Excavation and re-contouring of the Protore Stockpile, excavation of the Overburden Stockpile (started), and excavation of the White King off-pile areas.
- Placement of the Lucky Lass “black rock” material in the Consolidated Stockpile.
- Placement of excavated soils on the Consolidated Stockpile.
- Screening and stockpiling of 3-inch minus gravel for the topsoil/armor gravel mixture.
- Development of a topsoil borrow area upslope of the Consolidated Stockpile.
- Development of the West Borrow area.
- Initial placement of cover soil on the north and east lower slopes of the Consolidated Stockpile.

- Installation of additional groundwater monitoring wells and abandonment of designated existing monitoring wells. Ten wells remain for long-term monitoring.
- Excavation of exploratory test pits on the Lucky Lass Stockpile.

Remediation activities during 2006 included completion of White King excavation activities and initiation and subsequent completion of activities at the Lucky Lass Site. Work early in the 2006 season was focused on completing the excavation of the Overburden Stockpile, the Haul Road, and an additional off-pile area that was identified and delineated by gamma surveying in 2006.

The 2006 White King remediation construction activities included the following:

- Completion of the Overburden Stockpile excavation.
- Haul Road excavation.
- Identification and subsequent completion of the excavation of the additional off-pile area mentioned above. This additional off-pile area was located southeast of the Southwest Ditch Off-Pile Area.
- Completion of the placement and compaction of excavated soils on the Consolidated Stockpile.
- Completion of fine grading of the Consolidated Stockpile.
- Completion of the placement and grading of clean cover soil and the armor / topsoil layers on the Consolidated Stockpile.
- Completion of supplemental excavation and clean cover soil placement on off-pile areas, the Overburden Stockpile, and the Haul Road excavation area.
- Completion of the construction of three wetlands berms and associated outlet structures in the White King Meadow.
- Relocation of Augur Creek into historic channels.
- Revegetation of the three new wetland areas by seeding and planting willow cuttings and bushes.

- Hydroseeding the Consolidated Stockpile.
- Regrading and reseeding of borrow areas.
- Installation of fencing around the three wetlands and the Consolidated Stockpile.

Remediation construction activities at Lucky Lass were started and completed during the 2006 season, with the exception of removal of the “black rock” from Lucky Lass. Regrading the Lucky Lass Stockpile was started in late July.

The 2006 Lucky Lass remediation construction activities included the following:

- Excavation of soil above cleanup levels in the Lucky Lass off-pile areas.
- Placement of excavated Lucky Lass soils on the Lucky Lass Stockpile.
- Regrading of the Lucky Lass Stockpile.
- Cover placement on the Lucky Lass Stockpile.
- Regrading and placement of 4 inches of topsoil on the Lucky Lass Stockpile benches.
- Restoration of disturbed areas with 4 inches of topsoil.
- Hydroseeding the Lucky Lass Stockpile and benches.
- Installation of fencing around the Lucky Lass Stockpile.

Other construction completed during 2006 included the following:

- Completion of the restoration and reseeding of the Wetland Berm Borrow area, the West Borrow area, the Gravel Borrow Area, and other areas disturbed as a result of the remediation construction.
- At the conclusion of remediation construction in November 2006, Envirocon demobilized all equipment and temporary facilities used during construction. All trash, rubbish, and construction debris were also removed from the site.

3.5.2 Design Change Notices

During the implementation of remedial activities at the Mines Site, several issues regarding site conditions and construction were encountered. These issues were discussed with the Design Engineer of Record, Golder Associates, and resolutions to the issues were determined. A Design Change Notice was prepared by Golder's construction manager or Golder's design engineer for each construction issue that warranted a design or specification change. The Design Change Notices were approved by the design engineer and a PRP representative. Design changes that were considered significant required the approval of EPA's representative. A summary of Design Change Notices that were issued during the course of the project is presented in Table 3.5.2.

TABLE 3.5.2
DESIGN CHANGE NOTICE SUMMARY

WHITE KING / LUCKY LASS MINE

DCN No.	Date	Description
1	21-Jun-2005	Monitoring Well Abandonment: Number of abandoned wells was increased from 12 to 21.
2	29-Jun-2005	Exploratory Trenches (EXTs): Exploratory trenches on Consolidate Stockpile and Haul Road were eliminated.
3	10-Aug-2005	Drainage Features: Installed groundwater seep drainage features at the toe of the Consolidated Stockpile.
4	4-Oct-2005	Riprap Bedding: Increased rip-rap bedding maximum particle size from 2-inch to 3-inch.
5	9-Aug-2006	Lucky Lass Meadow Offpile Clean Soil Cover: Place clean soil cover at wet ground area along toe of Lucky Lass Stockpile as an alternative to excavation.
6	14-Oct-2006	Fence Post Concrete: Eliminated concrete to set fence posts.
7	14-Oct-2006	Lucky Lass Stockpile Cover: A 6-inch thick layer of Cover Soil was added to the cover design on the top of the Lucky Lass Stockpile.
8	16-Oct-2006	Lucky Lass Offpile Areas Topsoil Cover: Placed clean cover soil on the Lucky Lass east and west offpile areas as an alternative to excavation.
9	30-Nov-2006	Consolidated Stockpile Ditch 1C: Eliminated "Type E" drainage ditch along road.

3.5.3 Remedial Action Construction Costs

The ROD estimate for remedial action construction was \$6,330,182 for White King and \$349,000 for Lucky Lass, totaling \$6,679,182. Actual remedial action construction costs were \$4,920,474, not including costs to establish institutional controls.

3.5.4 Present and Anticipated Future Site Use

The Mines Site and surrounding areas are currently uninhabited. The nearest city is Lakeview, located 17 miles to the southeast. The closest permanent residents to the Mines Site live approximately 12 miles southeast of the Mines Site. The present and anticipated future use of the Site is for commercial production of timber and forage for domestic livestock as described in the current Forest Management Plan. Future on-site human receptors might include timber workers, USFS personnel, recreational users, and trespassers. Given the current and anticipated land use and ownership in the vicinity of the Site it is unlikely that residential use would occur in the future (See Figure 5 – Property Ownership Map). However, given the long-lived radionuclides (decay rate from days to 1,000s of years), the baseline risk assessment also evaluated potential risk under a future residential use scenario. In order to ensure protectiveness the current ICs prohibit residential use of the Site.

4 PROGRESS SINCE COMPLETION OF REMEDIAL ACTION

This is the first Five-Year review for the Site. This section summarizes the activities conducted since completion of the remedial action. As specified in the ROD, after completion of the remedial action, ICs, groundwater monitoring, and O&M activities were initiated to manage exposure pathways that could result in unacceptable risks. An Operations, Maintenance, and Monitoring Plan (OMMP) plan was developed (Golder, 2005e), which outlined the site activities to be performed after completion of the RA. The O&M activities have been conducted by the PRPs.

4.1 Institutional Controls

The White King/Lucky Lass Mines Site extends over federal lands managed by the US Forest Service and privately owned lands held by the Coppin Family Trust and Fremont Lumber. Figure 5 shows the location of the respective properties. In addition to the consolidation and covering of impacted soils on site, institutional controls (ICs) were established to help meet the Remedial Action Objectives. The ICs were established to prevent human exposure to soils and groundwater that exceed established standards and are discussed below. The ICs were put into place for the private land and a Forest Plan amendment was put into place for the portions of the Site on Forest Service Land. This amendment prohibits residential use of the Site, drinking water well drilling, permanent recreation sites, removal of stockpile material, and any other uses that impact the integrity of the mine waste repository and Lucky Lass stockpile, including grazing and off-road vehicle use. Due to the nature of the contaminants (radionuclides), institutional controls are expected to remain in place indefinitely for the site.

A title search for the private properties was conducted in the latter part of December 2009 and documented in a Preliminary Title Report that was issued for each property. The title reports show that an Easement and Equitable Servitude document was recorded in the Lake County deed records for the both the Fremont property and the Coppin Trust property. These documents include: (1) restrictions on the use of groundwater as long as the contaminant concentrations exceed risk-based standards, (2) protection of the wetland areas, and (3) land use restrictions that prevent residential and agricultural (food crops) use of the properties.

Institutional controls (ICs) for the site include both physical and administrative controls. As described in section 3, fencing was installed around the mine waste repositories and site boundary to restrict site access. Signs showing contact numbers for USFS and prohibiting unauthorized access were posted on the fence surrounding the mine waste repository.

Copies of the executed agreements are included in the Title Search Attachment 4. To ensure that current and future property owners are subject to the same restrictions and are required to provide the same access, the equitable servitude was recorded with the County Clerk for Lake County, State of Oregon.

Inspections conducted at the Site since 2006 indicate that the long-term ICs required by the ROD and ESD are being implemented.

4.2 Long Term Monitoring and O&M Activities

O&M of the remedy at the Site is conducted by the PRPs per the Consent Decree. Monitoring includes groundwater, surface water at the White King pond, and surface water and sediments at Augur Creek upgradient and downgradient of the mine waste repository.

Operations, maintenance, and monitoring requirements for the Site are described in the OMMP (Golder 2005e). Elements of the OMMP include the following activities:

- Inspection and maintenance of the White King and Lucky Lass stockpiles
- Groundwater monitoring for the White King Consolidated Stockpile
- Groundwater monitoring for the Lucky Lass Stockpile
- Maintenance of physical institutional controls (fencing and access controls)
- Augur Creek monitoring
- White King Pond monitoring

Post-construction monitoring performed at the Site has been documented in annual reports (Golder 2008; Golder 2009a, Golder 2010). A summary of monitoring results and findings is presented in Section 4.2.2.

The annual O&M costs for 2008 and 2009 were approximately \$130,000 and \$221,000 respectively. This includes oversight for both years. In 2009, in addition to ground water and pond monitoring, costs included Augur Creek benthic sampling, pond neutralization, and erosion repair on the White King consolidated stock pile and at the Lucky Lass stockpile.

4.2.1 Inspection and Maintenance

The U.S. Forest Service performs regular nonscheduled inspections at the Site to identify any O&M issues. The Forest Service also conducts routine maintenance on access roads and fences in the vicinity of the Site. The USFS notifies the PRPs of maintenance needs identified by the inspections. At least once a year the federal and state RPMs perform a site visit to evaluate overall site conditions. Inspection and maintenance of the stockpiles include:

- Preventing/repairing erosion of the stockpile cover
- Repairing holes in the cover from uprooted trees
- Preventing/repairing settlement in the cover leading to ponding on the stockpile
- Confirming condition of the cover vegetation
- Preventing/repairing erosion of stormwater drainage ditches
- Repairing and securing physical institutional controls (fencing, gates, locks, and warning signs)

Soil cover and side slopes of the capped stockpiles are also inspected for pooling of surface water which could indicate subsidence and could increase the infiltration of precipitation into the waste. The vegetation on the soil cover is inspected for areas that may need revegetation for continued erosion control.

Areas of significant erosion or settlement are repaired by backfilling with clean cover soil, covering with topsoil, and revegetating in a manner that restores the original cover thickness. Areas where sparse vegetation is not providing sufficient erosion control are revegetated by reseeded. No mowing or tree removal is currently performed on the stockpiles.

Fences, gates, locks, and warning signs are repaired or replaced as needed to maintain their effectiveness. The remedial design includes a 3-strand barbed wire fencing. Groundwater Monitoring

Groundwater monitoring is performed to verify that the covered stockpiles remaining after completion of remedial action are not adversely affecting the water quality in Augur Creek (i.e., via groundwater discharge to the creek).

Monitoring is conducted upgradient and downgradient at each of the two stockpiles. At the White King Site there are three upgradient wells and seven downgradient wells. At the Lucky Lass Site there is one upgradient well and five downgradient wells. One sample is obtained from each groundwater monitoring well for each monitoring event. Field meters are used to measure pH and conductivity for each monitoring well. Water samples from each monitoring well are sent to a qualified laboratory for analysis of hardness, alkalinity, total dissolved solids (TDS), uranium (total and dissolved), and Ra-226 (pCi/L). In addition, analysis for arsenic is included for the White King wells. Groundwater monitoring was performed in 2005 and 2006 to provide a baseline. Groundwater monitoring has been performed annually since 2006 (Golder 2008; Golder 2009a, Golder 2010), and is scheduled to continue until five years following completion of remedial action (i.e., until 2011). If there is no indication from this monitoring that the stockpiles are adversely affecting water quality in Augur Creek, then the OMMP specifies that groundwater monitoring will be discontinued.

4.2.2 White King Pond

Post-remediation monitoring of White King Pond includes the following:

- Monitor pH annually to determine whether application of additional neutralizing agents will be necessary
- Biosurvey of benthic macro invertebrates to support bioassessment of the pond

4.2.2.1 pH Monitoring

The pH criteria for White King Pond are:

- pH suitable for establishing and maintaining a benthic biological community

- pH such that the pond discharge does not cause pH in Augur Creek to go outside the water quality limits

If the pond becomes too acidic to meet the above criteria, then pond re-neutralization is performed by adding hydrated lime (or other suitable alkaline agent) to raise the pH of the upper 10 ft of the pond sufficient to meet the criteria discussed above. Benthic invertebrate monitoring determines if the pH has dropped too low for healthy aquatic habitat. A pH of <5.5 is taken as a sign that the pH may be too low for healthy aquatic habitat.

4.2.2.2 Habitat Monitoring in White King Pond

Habitat monitoring in White King Pond consists of benthic invertebrate sampling and taxonomic analysis. Because of the lack of an appropriate reference pond, the post-remediation samples are compared with baseline data from the pond acquired via the White King Pond and Augur Creek Study (Golder 2006a). Comparison of yearly monitoring data during the maintenance period with the baseline data gathered in 2004 and 2005 allows evaluation of the status of the benthic invertebrate community in the pond vis-à-vis the focus on maintaining a benthic community and providing a food source for wildlife. Habitat (benthic invertebrate) monitoring has been performed annually and compared to reference locations not impacted by mining activity. This monitoring and is scheduled to continue until five years following completion of remedial action (i.e., until 2011).

4.2.3 Augur Creek

Augur Creek is the compliance point for surface water quality standards. No inspection and maintenance is required for Augur Creek. Augur Creek has been monitored to:

- Ensure that following completion of the Remedial Action COCs have not migrated into Augur Creek via surface runoff from the stockpiles. This was accomplished by sampling and analysis of upgradient and downgradient samples of both water and sediments from Augur Creek.
- Ensure that the pH in White King Pond has not caused the pH in the creek to decrease below ODEQ's Goose Lake standard (Goose Lake Basin standard pH 7-9).

Monitoring of surface water and sediments in Augur Creek was performed once in 2007 (one year after completion of remedial action) to assess residual effects of remedial action construction (Golder 2008). Because of questions on water quality data, additional sampling and analysis of water in Augur Creek was performed in 2008 (Golder 2009a).

The OMMP specifies that additional Augur Creek monitoring will be performed only if a breach of either the White King or Lucky Lass stockpile covers is identified by the stockpile inspection (i.e., potential for contaminated material from the stockpiles being washed into the creek in stormwater runoff), or if groundwater monitoring indicates that stockpile leachate has the potential to adversely affect Augur Creek water quality. These conditions have not occurred.

5 FIVE-YEAR REVIEW PROCESS

The five-year review process for the Mines Site was initiated in January 2010. The Mines Site five-year review team was led by the EPA Remedial Project Manager (RPM) for the Mines Site (Mr. Bill Adams). Additional support was provided by the ODEQ RPM (Mr. Bob Schwarz), the ODE RPM (Mr. Tom Stoops), the USFS RPMs (Messrs Waiyen "Yogi" Yee and Norm Day) and the Tronox Project Manager (Mr. Russ Jones).

The following activities were conducted during the five-year review:

- Notice announcing the five-year review was printed in the Lakeview County Examiner and Klamath Falls Herald and News newspapers in February 2010. After completion of the five-year review, copies of the report will be made available via the administrative record. A public notice to announce the availability of the report will be issued.
- A site inspection of the Mines Site was performed on August 4, 2009, by EPA, ODEQ, ODE, USFS, and the PRPs. (Note: due to the high elevation of the Site and presence of snow late into the Spring, access to the Site immediately preceding the completion of the five-year review report was not possible). The purpose of the inspection was to assess the protectiveness of the remedy, including the access restrictions at the Site. The site inspection checklist is included in Attachment 4.

- Informal input was received from the federal and state RPMs as well as comments on the draft five-year review.

The five-year review team conducted a technical assessment of the Mines Site and the findings and recommendations are provided in this report.

5.1 Document and Data Review

This five-year review consisted of a review of relevant documents which included, but were not limited to, RI reports; remedial action reports; construction completion reports, construction completion reports for erosion repairs; fence maintenance; and pond neutralization; monthly progress reports required by the consent decree; and any other OMMP reports. The applicable groundwater cleanup levels specified in the ROD were also reviewed. A complete list of the documents reviewed is shown in Attachment 1. The five-year review team also conducted a review of the operations, maintenance, and monitoring data collected from 2006 to 2009. The groundwater monitoring data are presented in Attachment 2.

A Title Search was conducted in December 2009 by Tronox (Attachment 5) for EPA. An evaluation of the Title Report by EPA confirmed that Institutional Controls were recorded on all the parcels.

5.2 Site Inspection

A Site inspection was conducted by the five-year review team on August 4, 2009. The inspection team members were as listed above. The White King Consolidated Stockpile and Lucky Lass Stockpile caps, fencing, and side slopes were inspected. No significant issues affecting the protectiveness of the remedy were noted during the site inspection. The site inspection results are included in Attachment 3. The five-year review team agreed that deed restrictions, continued annual groundwater monitoring, and annual site inspection/O&M activities are adequately addressing exposure issues at the site. See Figures 3 and 4 for maps of the items evaluated in the inspection at White King and Lucky Lass. Attachment 3 is the annual site inspection checklist.

5.3 Interviews

Informal interviews were held with parties familiar with the Mines Site. Overall, there were no significant problems identified in the interviews. The interviewees included representatives from ODE, ODEQ, the Forest Service, and Tronox.

6 TECHNICAL ASSESSMENT

In accordance with current EPA guidance (EPA, 2001), a five-year review should determine whether the remedy at the site is protective of human health and the environment. The technical assessment of a remedy examines three questions which provide a framework for organizing and evaluating data and information and ensures that all relevant issues are considered when determining the protectiveness of the remedy. These questions are presented in the following sections.

6.1 Question A:

Is the remedy functioning as intended by the decision document?

Yes. The review of documents (Attachment 1) and the OMMP and site inspection results indicate that the remedies are functioning as intended in the ROD and ESD and have met the intent of the ROD and ESD.

The selected remedy for the Site included the following:

6.1.1 Stockpile Inspection and Maintenance

The soil covers over the stockpiles and off-pile areas show no significant erosion, and only minor erosion that did not penetrate the cover was observed in a few areas. Stockpile slopes are stable and vegetation is becoming established. This indicates that the remedy is performing as expected with respect to preventing direct exposure of contaminated soils to humans and ecological receptors.

Surface water management facilities have performed well. Lined ditches have shown no signs of erosion or other damage, with the exception of one segment as described below.

Only one round of maintenance has been required at the Site between the time that construction was completed and this report. Sometime in the summer of 2007, a large rainfall event occurred

that altered the assumed flow regime adjacent to the drainage channel along the south margin of the Consolidated Stockpile cover and washed out several hundred feet of riprap lining in the channel. No further damage occurred over the next two years, and the damaged channel section was deepened, re-shaped, and re-lined during the summer of 2009. A geotextile layer was placed under the replaced riprap to prevent loss of the bedding layer. These repairs and modifications are expected to increase the erosion resistance of this portion of the surface water management system and prevent damage from these types of unexpected flow conditions in the future.

During the 2007 inspection, gullies up to about one foot deep were observed in the clean soil cover of the off-pile area above the Brow Ditch at the north end of the White King highwall. As part of 2009 maintenance, this area was regraded, and low berms (water bars) were installed perpendicular to the flow path to reduce velocity and direct runoff into the Brow Ditch. The surfaces of the berms were covered with soil containing armor rock to reduce the potential for erosion. The access road immediately upslope of this area was regraded to direct runoff away from this area. New surface water diversion and drainage ditches were constructed adjacent to and downstream of this area. These repairs and modifications are expected to reduce the amount of flow onto the cover in this area, reduce flow velocities, and increase erosion resistance.

Minor regrading was performed in 2009 at other points along the Site access road to repair erosion.

During the 2009 inspection, erosion of the soil cover on the bench area west of the Lucky Lass Stockpile was observed. Eroded areas were regraded, and water bars and new drainage ditches similar to those in the White King off-pile area were constructed.

On the basis of the maintenance that has been required during the first five years after implementing the remedy, it appears that the main cause of potential damage is infrequent, high intensity rainfall events that produce localized flow conditions different from those assumed in the design. The major components of the remedy (the covers and surface water ditches, except as noted) have withstood such events with no damage, and maintenance activities have minimized the potential for repeated damage of the previously-susceptible channel section under this type of precipitation. Nevertheless, annual inspections should continue at least through the

second 5-year period to verify that erosion damage has not occurred and to identify additional maintenance that may be required.

6.1.2 Groundwater Monitoring

Groundwater monitoring data for the Site from 2005 through 2009 is presented in the most recent monitoring report (Golder 2010) which is an attachment to this report. The analytical results are summarized in Tables 3 and 4 for White King, and Tables 5 and 6 for Lucky Lass.

At White King, upgradient groundwater COC concentrations generally appear to be stable. Downgradient averages for arsenic and radionuclides have shown a slight but steady decrease since 2005. Thus, it appears that the consolidation and covering of the White King materials has been effective at protection of groundwater, and that groundwater at White King is slowly recovering from pre-remediation contamination.

At Lucky Lass, the uranium concentration in the upgradient well, which is greater than in downgradient wells, has decreased since 2005. Upgradient concentrations of Ra-226 appear to be stable, fluctuating around the detection limit. The uranium concentrations in two of the three downgradient Lucky Lass wells have been below the practical quantitation limit (PQL) all five years. The uranium in the third downgradient well appears stable. Thus, it appears that the consolidation and covering of the Lucky Lass materials have been effective at protection of groundwater.

The Consent Decree between the Agencies and the PRPs is for groundwater monitoring to occur until 2011. If no statistically significant increase in downgradient groundwater concentrations of Site radium, uranium, or arsenic (White King only) is observed, groundwater monitoring can be discontinued.

6.1.3 White King Pond pH Monitoring and Neutralization

The White King Pond was initially neutralized in 1999 and has been re-neutralized twice since (2004 and 2009). There is a presumed source of acidity at the bottom of the deepest part of the pond, at the location of the submerged main shaft of the former underground mine workings. Monitoring of pH in the pond has shown a gradual decrease in the pH following re-

neutralization. It appears that ongoing re-neutralization at approximately five-year intervals may be necessary to maintain a neutral pH in the pond (>5.5).

6.1.4 White King Pond Biological Monitoring

Biological monitoring of White King Pond (benthic invertebrate sampling and taxonomic analysis) was performed for the initial study in 2004 and 2005 (Golder 2006a), and annually since completion of remedial action (Golder 2008; Golder 2009a).

White King Pond's benthic community appears to be relatively healthy and appears to have improved, in some ways, following neutralization. The density of benthic invertebrates in littoral habitats greatly exceeds 50 to 100 individuals/m² (and averages more than 1000/m²). Diversity is reasonable and reflects a community typical of what would be expected in a pond with similar physical characteristics to the White King Pond. There are no overwhelmingly dominant taxa. The number and density of organisms in the samples was significantly lower in 2004 and 2007 than in 2005 and 2008.

If the results of 2009 monitoring (evaluation awaiting receipt of taxonomic analytical results) are consistent with or improved from 2005 and 2008 results, then it could be considered demonstrated that a sustainable healthy habitat exists in White King Pond (as long as the pH remains suitable), and therefore biological monitoring would be discontinued.

Opportunities for Optimization

The only opportunities for optimization that have been identified are potential reduction in monitoring, to reduce costs, as discussed above.

6.1.5 Institutional Controls

As previously stated in Section 4.1 a title search for the private properties was conducted in December 2009 and documented in a Preliminary Title Report issued for each property (Attachment 4). The title reports show that an Easement and Equitable Servitude document was recorded in the Lake County deed records for both the Fremont property and the Coppin Trust property. These documents include (1) restrictions on the use of groundwater as long as the contaminant concentrations exceed risk based standards, (2) protection of the wetland

areas, and (3) land use restrictions that prevent residential and agricultural (food crops) use of the properties.

No groundwater wells have been installed on the Mines Site with the exception of monitoring wells installed as part of the post-closure monitoring program. Fencing has been installed around the White King consolidated stockpile and fencing exists around the perimeter of the entire Mines Sites. Additional fencing exists around each of the three wetland areas. Access gates from Forest Road 3780 are in place and locked. The fencing is in generally good condition with some minor repairs necessary due to heavy snow in the winter and cattle in the summer. There has been no evidence of tampering with the soils in the consolidated stockpile.

Cattle were found grazing on the property in the summer of 2008 so additional fencing was installed in early 2009 to close off access from west side of the Mine Site. During the 2009 inspection, though cattle were present in the general vicinity of the Mines Sites, it appeared that the fencing was keeping them out of the Mines Site per se. Human access to the property appears to have occurred in the past as the fence by the back gate had been cut to allow access to the property. This was repaired by the Forest Service and no intrusive activity was evident.

In summary, the necessary institutional controls are in place to prevent exposure to COCs in the soil and groundwater at the Site and appear to be effective. Periodic monitoring of the fence should be conducted and repairs made if necessary, as discussed below.

6.1.5.1 Fence Inspection and Maintenance

During the 2008 inspection, some broken wires were observed in the barbed wire fences installed as part of the remedy, particularly those surrounding the wetlands. This damage is believed to result from cattle pushing against the fences. As part of the 2009 maintenance activities, these fences and their support structures were repaired. Also, in early 2009, the USFS reconstructed barbed wire fences across the lower end of the White King meadow to exclude grazing cattle. As a result, the vegetation in the meadow area recovered noticeably during the 2009 growing season and was significantly more established than in previous years.

Keeping cattle from remediated areas is important to the continued success of the remedy, as well as the biological health of the adjacent areas (e.g., the White King Meadow). From the

standpoint of remedy reliability and the biological health of the Site, cattle should be permanently prohibited from grazing near the stockpiles. If cattle cannot be prohibited from areas near the Site, then ongoing fence maintenance by the USFS will remain important for at least the near future in order to protect vegetation in remediated areas.

6.1.5.2 Legal/Regulatory Controls

Kerr McGee, Fremont Lumber Company, and Western Nuclear Incorporated entered into a Consent Decree with EPA, which was approved by the Court on January 20, 2006. The Consent Decree provided that the three Settling Defendants would perform the Remedial Design and Remedial Action required at the Site. The work performed at the Site to date has been performed by Kerr McGee or Tronox Incorporated on behalf of the Settling Defendants. Tronox Incorporated (“Tronox”) was spun off from KerrMcGee in 2006 and retained the liability for performance under the Consent Decree. On January 12, 2009, Tronox filed a petition for voluntary reorganization under chapter 11 of the U.S. Bankruptcy code. During the pendency of the bankruptcy proceedings, Tronox has continued to perform work required by the Consent Decree. Financial assurance for completion of operations, maintenance, and monitoring at the Site remains in place and the two remaining settling defendants are also liable to perform the work required by the Consent Decree.

6.1.6 Early Indicators of Potential Issues

There are no early indications of potential future issues other than those discussed above.

6.2 Question B:

Are the exposure assumptions regarding toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?

Yes. Nothing in the inspections and monitoring performed since completion of remedial action suggests that the exposure assumptions, toxicity data, cleanup levels, or remedial action objectives (RAOs) used at the time of remedy selection are not still valid for the stockpile consolidation (the primary component of the remedy; see Section 4.1 for details).

For White King Pond the ROD required maintenance of the pond, surface water management, and monitoring. A study of White King Pond completed in 2006 (Golder, 2006a) concluded that no sediment remediation of the pond was needed. According to the report, “The results (both Phases 1 and 2) indicate that there was no need for additional remedial action targeted at sediments, because there was an established benthic invertebrate community that provides food for wildlife and because estimated risks to wildlife due to White King Pond were below the acceptable risk threshold of $HQ=1$. ”

This conclusion has been substantiated in subsequent monitoring of White King Pond (see Section 6.1.3 and 6.1.4.

No remediation of sediments in Augur Creek was required in the remedy. A study of Augur Creek sediments (Golder 2006a) found that average concentrations of arsenic, U-234 and U-238 were higher in samples downstream of the Mines Sites than in upstream samples and that the differences were statistically significant.

In 2009, the Oregon Department of Environmental Quality (ODEQ) requested further study of Augur Creek sediments, focused on potential effects on aquatic organisms (specifically benthic invertebrates). The field work for this study, following the workplan approved by the Agencies (Golder 2009b), was performed in 2009. The results of the taxonomic analyses for this study were recently received and a report on the results is pending. The purpose and goals for this study are:

- 1) Determine if invertebrate community structure is impaired above and below the White King Mine; and
- 2) Determine if any correlation between measures of community structure and arsenic concentration can be observed; and
- 3) Based on results from 1 and 2, provide a basis for monitoring natural recovery in Augur Creek.

The toxicity data, cleanup levels, and RAOs used at the time of the remedy selection (ROD and ESD) are still valid. There have been no changes in the potential exposure pathways at the Site. The exposure assumptions used to develop the human health risk assessments remain valid. There has been no change in the toxicity factors for the primary COCs (arsenic, radium-226, and uranium).

Institutional controls specified in the ROD and ESD will continue to prevent excavation, construction, groundwater use as drinking water, or other incompatible uses at the Site. A title search of the properties at the Site confirmed that the land use restrictions are still in place. Land use at the Site remains consistent with the ICs and the selected remedy.

There have been no changes in the physical conditions of the Site that would affect the protectiveness of this remedy.

6.3 Question C

Has any other information come to light that could call into question the protectiveness of the remedy?

No. There is no new information that would question the protectiveness of the remedy. The groundwater monitoring data indicate that groundwater contaminant concentrations have not exceeded standards (since 2005). The review of O&M and performance monitoring data indicates that the ICs and O&M activities at the Site continue to be protective.

6.4 Technical Assessment Summary

Based on a review of the historical site information (remedial investigation, remedial action and LTM) data, the remedy is functioning as intended by the ROD and ESD and remains protective. The physical conditions of the Site have not changed, and the cleanup goals cited in the ROD for soil and groundwater are being met. The only issue identified which could potentially affect future protectiveness is the need for continued neutralization of the White King Pond on approximately a five year interval in order to maintain stable pH, at least until a diverse habitat is established. Two other minor issues were identified in this review that do not affect

protectiveness but require follow-up: a) Keeping cattle from remediated areas is important to the continued success of the remedy, as well as the biological health of the adjacent areas (e.g., the White King Meadow) and b) the need to evaluate the monitoring results in 2010 and discontinue groundwater monitoring if there are no significant changes from the current protective levels.

7 ISSUES

Table 7-1 lists the issue identified in this five-year review for the Mines Site.

Table 7-1: MINES SITE Issues

Issue	Affects Current Protectiveness?	Affects Future Protectiveness?
Continued Neutralization of the White King Pond on approximately a five year interval in order to maintain stable pH.	No	Yes

Three other issues were identified which do not affect protectiveness include: 1. Keeping cattle from remediated areas to insure continued success of the remedy, as well as the biological health of the adjacent areas (e.g., the White King Meadow), 2. Evaluate the monitoring results in 2010 and discontinue groundwater monitoring if there are no significant changes from the current protective levels and 3. Review results of 2009 Augur Creek monitoring (when report issued) to establish trends and ensure the remedy is protective.

8 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 8-1 lists recommendation to address the issue identified in this review. The EPA and the PRPs will be the parties responsible for implementing the recommendations.

Table 8-1: Summary of Recommendations and Follow-Up Actions

Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Proposed Milestone Date	Follow-Up Actions: Affects Protectiveness (Y/N)	
				Current	Future
Continued neutralization of the White King Pond on approximately a five-year interval in order to maintain stable pH.	PRPs	EPA	7/18/2015	N	Y

Additional follow-up items which do not affect protectiveness include keeping cattle from remediated areas which is important to the continued success of the remedy, as well as the biological health of the adjacent areas (e.g., the White King Meadow). Work with the Forest Service to ensure that fence repairs on federal lands are made. Also evaluate the monitoring results in 2010 and discontinue groundwater monitoring if there are no significant changes from the current protective levels. Review the 2010 groundwater monitoring results with the Support agencies and collectively make a decision on what, if any, groundwater monitoring will be required past 2010. Evaluate the results of 2009 Augur Creek monitoring (when report issued) to establish trends and ensure the remedy is protective.

9 PROTECTIVENESS STATEMENT

The remedial actions at the Site are complete and protective of human health and the environment. Based upon the review of relevant documents and the site inspection, the remedy is functioning as intended by the ROD and ESD. There have been no changes in the physical condition of the Site that would affect the protectiveness of the remedy. Long-term protectiveness of the RAs will continue to be ensured and verified by Institutional Controls (ICs), LTM, and O&M., which includes monitoring of groundwater COC concentrations and inspection and maintenance of the integrity of the White King Consolidated stockpile and the Lucky Lass stockpile caps and fences.

10 NEXT REVIEW

The next five-year review for Mines Site will be completed by May 2015. The integrity of the White King Consolidated stockpile and Lucky Lass stockpile caps, groundwater monitoring data, and ICs should be reviewed to ensure that the land use and groundwater restrictions are still in place and continue to be protective.

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FIGURES

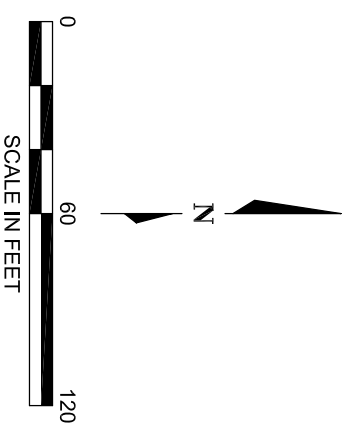
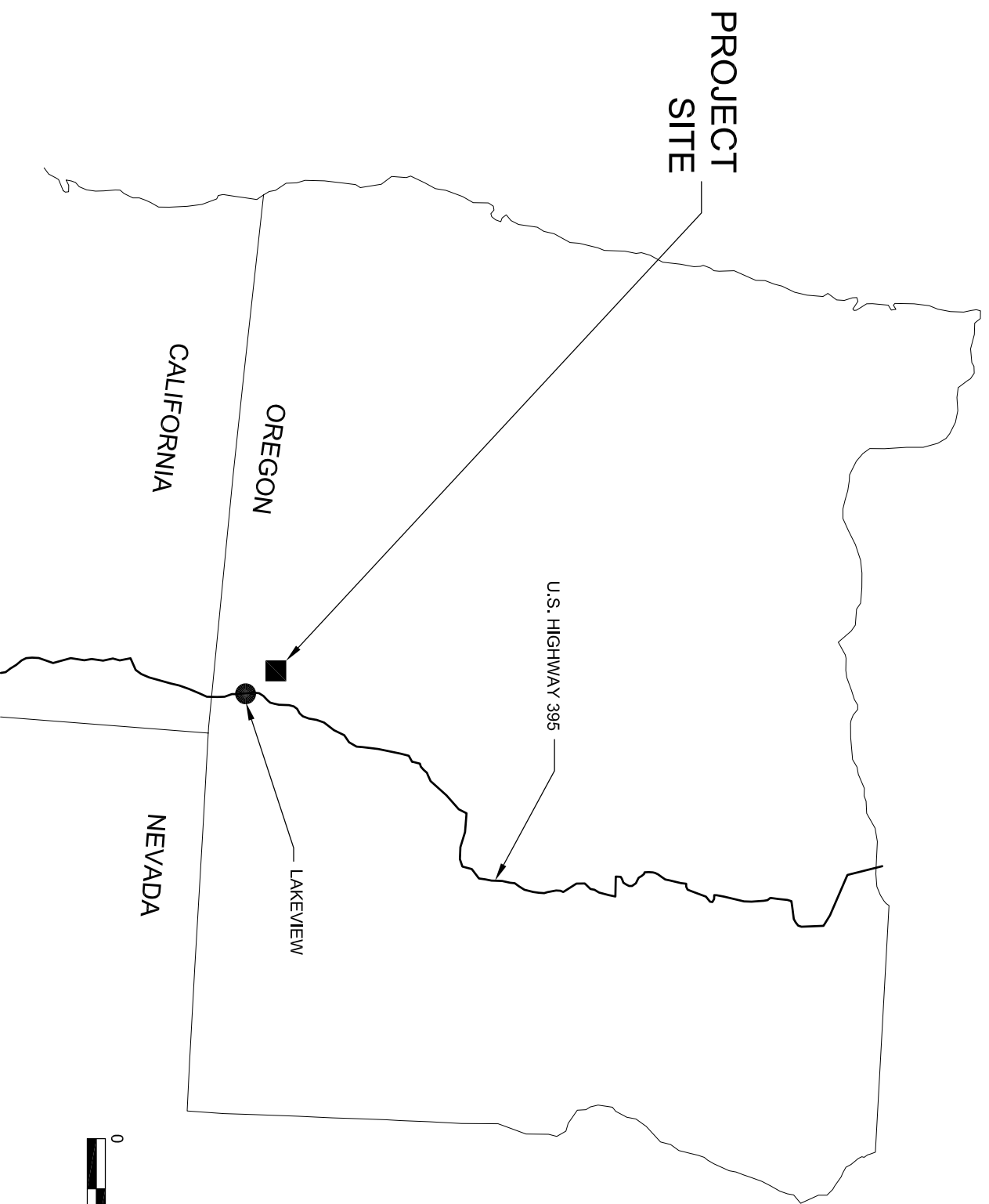


FIGURE 1
PROJECT LOCATION
WHITE KING - LUCKY LASS / OR

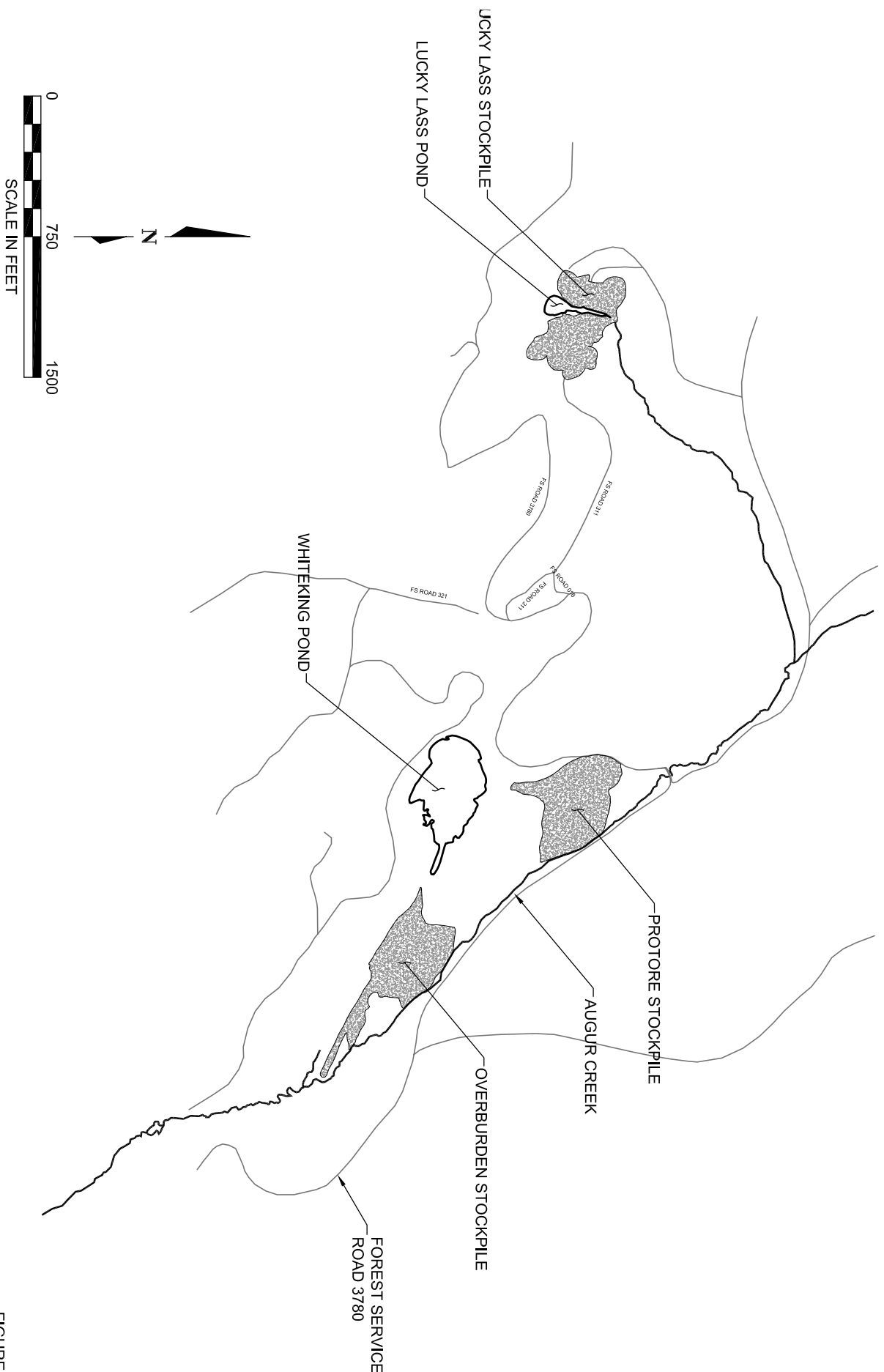


FIGURE 2
SITE MAP
WHITE KING - LUCKY LASS / OR

Figure 3: White King Annual Inspection Items Map

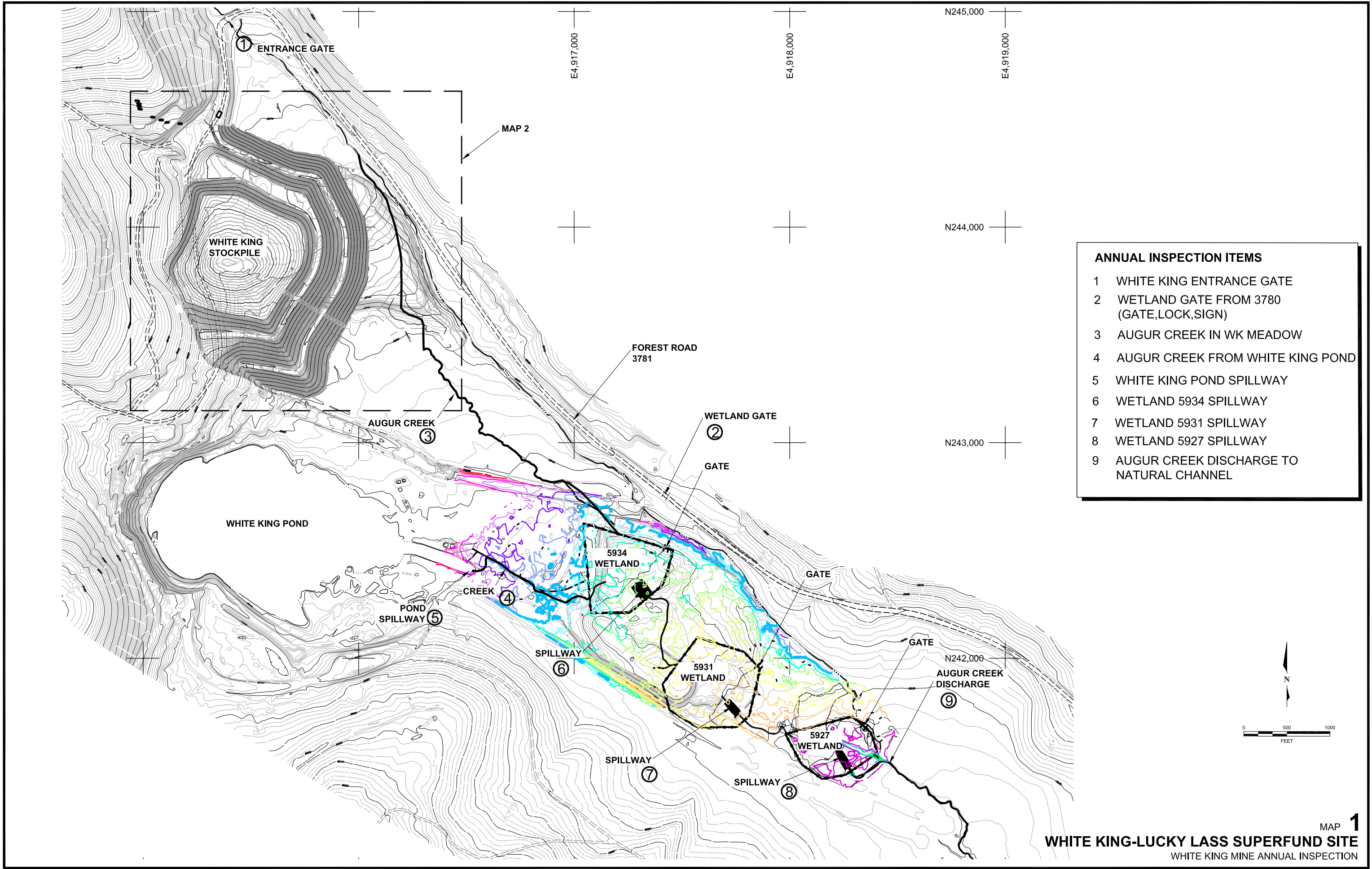
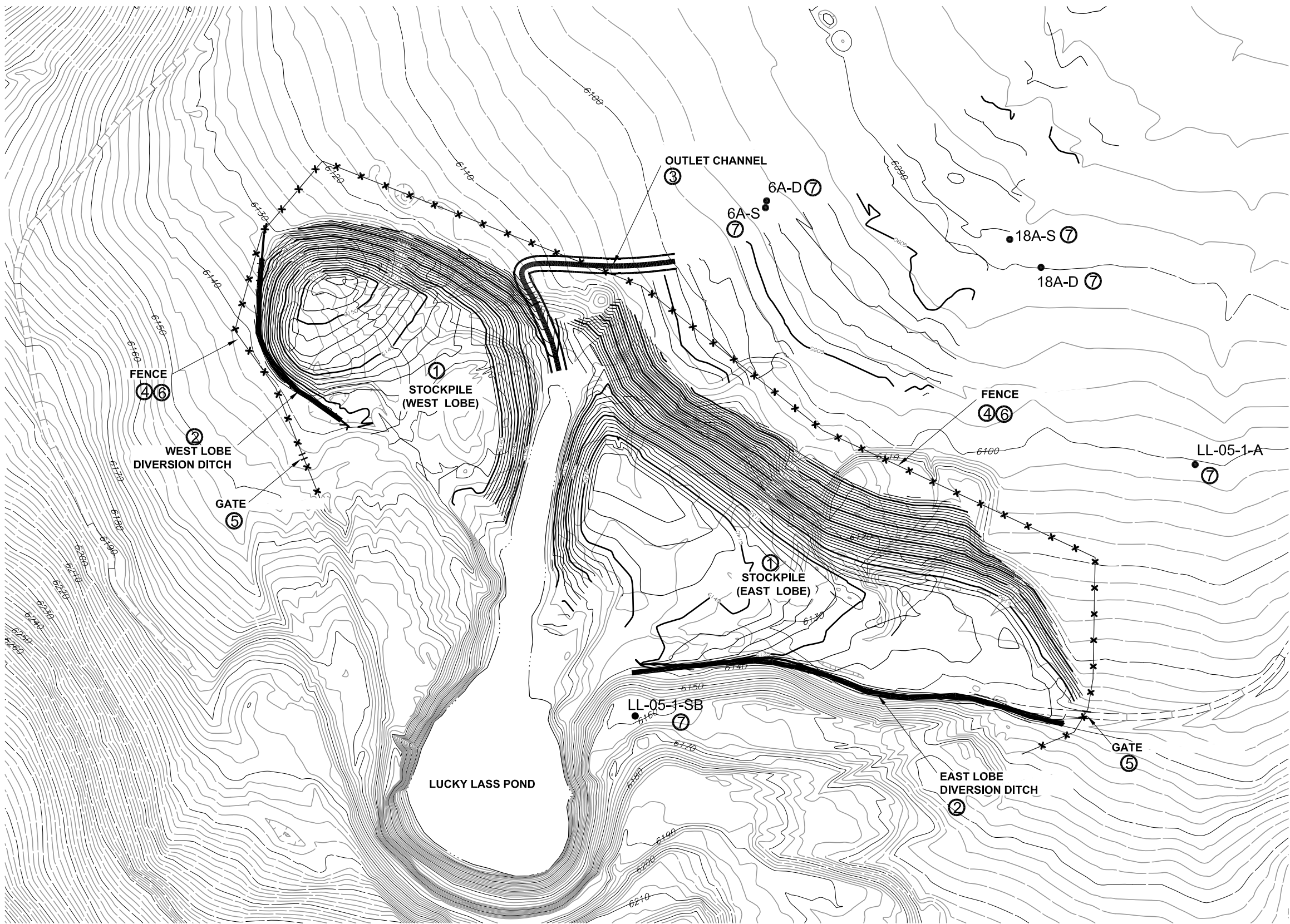


Figure 4: Lucky Lass Annual Inspection Items



ANNUAL INSPECTION ITEMS

- 1 LUCKY LASS STOCKPILE
VEGETATION
EROSION
SETTLEMENT
- 2 STORMWATER DITCHES
- 3 LUCKY LASS OUTLET CHANNEL
- 4 FENCING
- 5 GATES AND LOCKS
- 6 WARNING SIGNS
- 7 MONITORING WELLS (6 TOTAL)

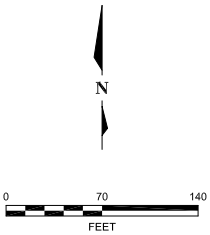
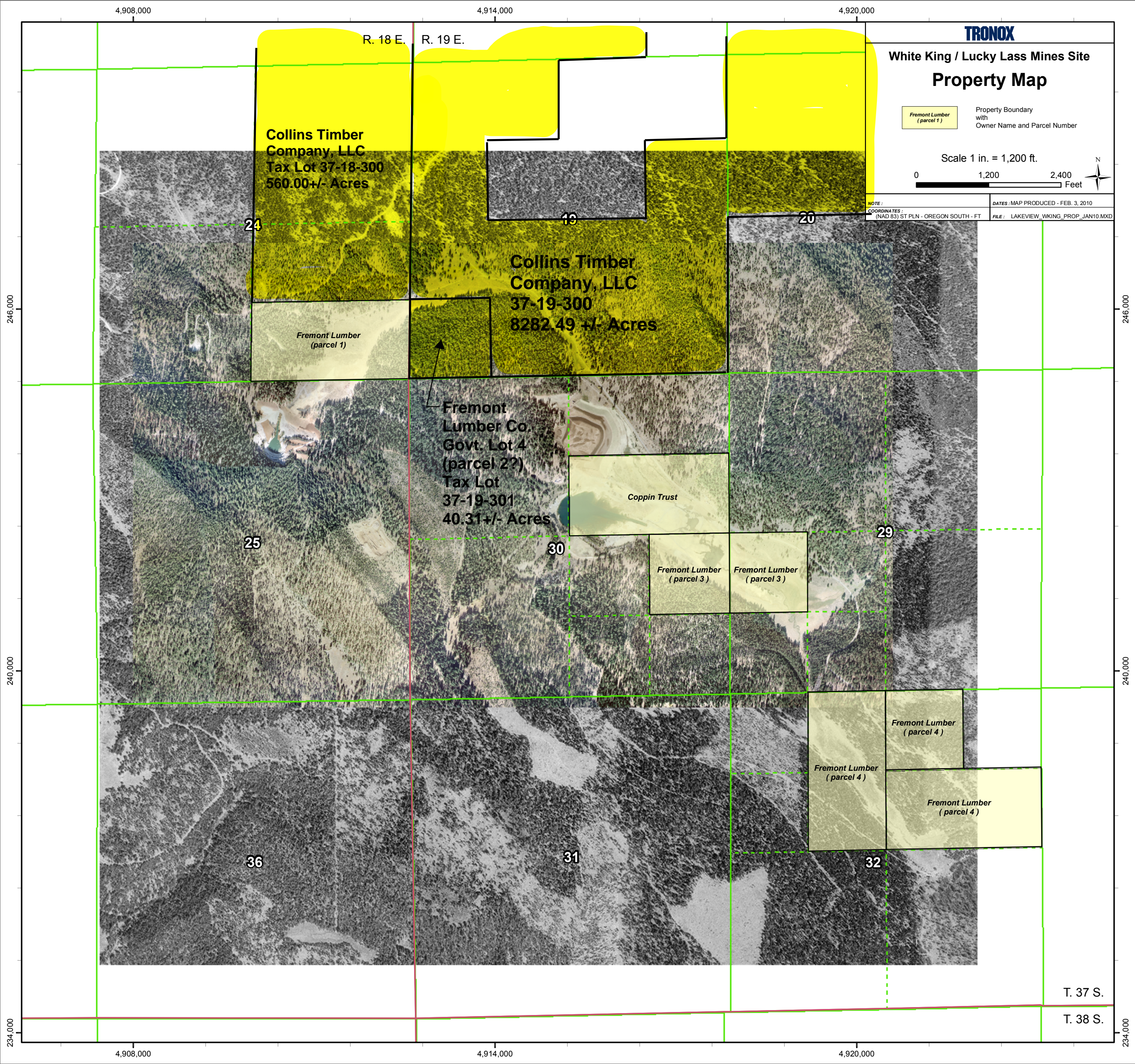


Figure 5: Property Ownership Map



Attachments

Attachment 1: LIST OF DOCUMENTS REVIEWED

Amerititle 2009. Preliminary Title Report for: Fremont Lumber Company. Lakeview, Oregon, December 2009.

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Attachment 2: 2009 Groundwater Monitoring Report



REPORT

Report On 2009 Groundwater Monitoring at the White King / Lucky Lass Mines Superfund Site

Submitted To: U.S. Environmental Protection Agency
Region X
Seattle, Washington

Submitted By: Tronox LLC
Western Nuclear Inc.
Fremont Lumber Co.

Submitted By: Golder Associates Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA, 98052 USA

February 17, 2010

Project No. 033-1398-001.630

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Table of Contents

1.0	INTRODUCTION.....	1
1.1	Background	1
1.2	Purpose and Scope.....	1
2.0	GROUNDWATER	2
2.1	Methods.....	2
2.1.1	Field Sampling.....	2
2.1.2	Laboratory Analysis.....	2
2.1.3	Statistical Analysis.....	2
2.2	Results and Discussion.....	3
2.3	QA/QC.....	4
3.0	SUMMARY AND CONCLUSIONS.....	6
4.0	REFERENCES.....	7

List of Tables

Table 1	White King Well Locations
Table 2	Lucky Lass Well Locations
Table 3	White King Groundwater Analytical Results
Table 4	White King Groundwater Statistical Summary
Table 5	Lucky Lass Groundwater Analytical Results
Table 6	Lucky Lass Groundwater Statistical Summary

List of Figures

Figure 1	Vicinity Map
Figure 2	Groundwater Monitoring Well Locations - White King
Figure 3	Groundwater Monitoring Well Locations - Lucky Lass

List of Appendices

Appendix A	Groundwater Monitoring Well Logs
Appendix B	Statistical Analysis Output for Groundwater
Appendix C	Data Validation Checklists

1.0 INTRODUCTION

This report documents the 2009 post-construction monitoring of the White King/Lucky Lass Mines Superfund Site (the Site), performed in accordance with the Operation, Maintenance, and Monitoring Plan (OMMP) for the Site (Golder, 2005a).

1.1 Background

The Site is located in south-central Oregon, approximately 17 miles northwest of Lakeview, Oregon (Figure 1). The Site consists of two former uranium mines, located within one mile of each other. Portions of the Site are within the Fremont National Forest, managed by the United States Forest Service (USFS), and portions are on private lands owned by Fremont Lumber and the Coppin Family Trust.

The two former uranium mines, White King Mine and Lucky Lass Mine, collectively encompass approximately 140 acres. Major features at the White King Mine include the White King Pond (formed when water collected in the open-pit), the former so-called "Protore Stockpile", and the former "Overburden Stockpile". Both stockpiles were actually composed of overburden materials. The pit pond occupies approximately 13 acres and contains approximately 80 million gallons of water. The two stockpiles contained a combined volume of almost one million cubic yards of material. Augur Creek runs south through the eastern side of the White King area, and receives discharge from the White King Pond.

Major features at the Lucky Lass Mine include the Lucky Lass Pond and former associated overburden stockpile. This pond covers approximately 5 acres. The Lucky Lass Stockpile covered approximately 14 acres and contains approximately 260,000 cubic yards of material.

The lead agency for Site activities was the United States Environmental Protection Agency (EPA). Other agencies involved were the USFS, the Oregon Department of Environmental Quality (ODEQ), and the Oregon Department of Energy (ODE).

The Record of Decision (ROD) was issued by the EPA for the Site in 2001 (EPA, 2001). Design of the selected remedy is described in the design report (Golder, 2005b). Remedial action construction was performed in 2005 and 2006 and documented in a closure report (Golder, 2007).

1.2 Purpose and Scope

The purpose of this report is to provide the third year of post-construction monitoring results. The OMMP (Golder, 2005a) specifies one-time monitoring of the water and sediment in Augur Creek and five years of post-construction monitoring of groundwater and White King Pond. This report documents groundwater monitoring; monitoring of White King Pond and Augur Creek have been prepared separately.

2.0 GROUNDWATER

Groundwater monitoring was performed to determine if groundwater is being adversely impacted by the closed stockpiles at White King and Lucky Lass. Monitoring well locations are shown on Figure 2 for White King and Figure 3 for Lucky Lass. Coordinates for these wells are given in Table 1 for White King and Table 2 for Lucky Lass. Well logs are provided in Appendix A.

2.1 Methods

2.1.1 Field Sampling

Groundwater sampling was performed in accordance with the procedures outlined in the OMMP (Golder, 2005a). Groundwater samples were collected September 21-22, 2009. Samples were collected from 10 wells at the White King Mine in two sets. One set monitors the alluvial groundwater (upgradient 12A-S, and downgradient WK-05-1A, WK-05-2A, WK-05-3A, WK-05-4A), and one set monitors the shallow bedrock (upgradient 12A-D and 16A, and downgradient WK-05-1-SB, WK-05-2SB, and WK-05-3SB).

Samples were collected from four wells at the Lucky Lass Mine: one upgradient from the stockpile (LL-05-1-SB) and three wells downgradient of the stockpile (LL-05-1A, 6A-S, and 18A-S).

2.1.2 Laboratory Analysis

Groundwater samples were sent to General Engineering Laboratories (GEL) in Charleston, South Carolina. Groundwater samples were analyzed for:

- Total uranium by SW846 3005/6020
- Total radium-226 by modified EPA Method 903.1
- Total arsenic by SW846 3005/6020 (White King wells only)
- Total calcium and magnesium by SW846 3005/6020
- Hardness by SM 2340B
- Alkalinity by SM 2320B
- Total dissolved solids (TDS) by SM 2540C.

2.1.3 Statistical Analysis

Data collected during 2009 was statistically compared to data collected in 2005 (preconstruction) and 2008. The Wilcoxon Rank Sum Norm (Mann-Whitney) test was used to determine if differences in the groundwater analyses between two years are statistically significant (EPA 2000). In the Mann-Whitney test, two population distributions are compared, allowing a "before and after" comparison.

The statistic is calculated by first listing and ranking the measurements for each population from smallest to largest. The statistical analysis examined each parameter separately. The null hypothesis (H_0) was that the median concentration of each population is the same. A one-tailed test was used, where the

alternate hypothesis (H_A) was that the median concentration of the recent population is greater than that of the earlier population.

The Mann-Whitney test is non-parametric and does not assume that the underlying distributions are normal. Because the Mann-Whitney test ranks the measurements from smallest to largest, results can be misleading if many of the data values are the same because the relative ranks are the same. Conversely, the test is robust with respect to outliers because the relative magnitude of these to the rest of the data is important.

A statistical analysis could not be conducted for the Lucky Lass mine's upgradient groundwater results because samples were collected from only one upgradient well.

Statistical analyses were conducted in Analyse-it® Version 2.21 (an add-in for Microsoft Excel®). A summary of statistical results for groundwater is provided in Table 4 for White King and in Table 6 for Lucky Lass. Details of the statistical analysis are provided in Appendix B.

2.2 Results and Discussion

The groundwater quality data (2005 through 2009) for the White King wells are provided in Table 3. At White King, upgradient groundwater concentrations generally appear stable. Upgradient arsenic concentrations have been consistently below the PQL of 5 µg/L. Uranium in the upgradient groundwater has been consistently below the PQL. Ra-226 in the upgradient groundwater appears stable, fluctuating below and just above the minimum detectable activity (MDA) (however, 2009 was the first year where all upgradient wells had detectable Ra-226). Downgradient averages for arsenic and radionuclides have shown a slight but steady decrease since 2005. The average changes in concentrations at White King were not found to be statistically significant for both upgradient and downgradient groundwater (Table 4).

The groundwater quality data (2005 through 2009) for the Lucky Lass wells are provided in Table 5. At Lucky Lass, the uranium concentration in the upgradient well, which is greater than in downgradient wells, has decreased since 2005. Upgradient concentrations of Ra-226 appear stable, fluctuating around the MDA.

At Lucky Lass, the uranium concentrations in downgradient wells 6A-S and LL-05-01A have been below the PQL all five years. In the prior monitoring report (Golder, 2009), attention was drawn to an apparent increasing trend in downgradient well 18A-S for uranium. However, the 2009 concentration for uranium in well 18A-S (0.66 µg/L) was lower than the 2008 concentration (2.3 µg/L) and similar to the 2007 concentration (0.6 µg/L). The average changes in Ra-226 and uranium concentrations at Lucky Lass were not found to be statistically significant for downgradient groundwater (Table 6).

2.3 QA/QC

Quality assurance / quality control (QA/QC) procedures were used during field sampling and laboratory analysis as specified in the Quality Assurance Project Plan (QAPP; Golder, 2003). Trip blanks and unfiltered field blanks were collected during each type of sample collection for QA/QC of water quality parameters.

Data validation was performed on each sample delivery group received from the laboratory, using guidelines established by the Superfund Contract Laboratory program. Data quality criteria were those in the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA, 2004), the Site QAPP, and laboratory established recovery indices as appropriate.

Data qualification is applied to the level of detection as relates to the laboratory practical quantitation limit (PQL) for inorganic parameters, or the laboratory detection limit (DL) appropriate to radiochemistry parameters. Data qualification is also applied to analytical results as a result of deficiencies identified during the course of validation. A summary of the data validation qualifiers is provided with the checklists in Appendix C.

The following data qualifications were applied as a result of the data validation:

- Serial dilution results associated with sample WK-05-1-A were out of limit for magnesium (Mg).
- Calculated Hardness data associated with sample WK-05-1-A is qualified as estimated (J).
- Ra-226 was out of limit for WK05-1A laboratory duplicate (146% RPD) and the Ra-226 value has been qualified as estimated 'J'.

Since matrix effects can be associated with ionic interference in select samples, only the sample included in the serial dilution test is qualified as estimated (J). Mg and Ca are used to generate a hardness value for the water associated with the indicated sample. Therefore, calculated hardness is also affected by the out of limit serial dilution data for Mg.

Sample WK-05-1A was selected as the laboratory duplicate for Metals (As, Ca, Mg, and U) and radiochemistry (Ra-226). WK-05-1A and WK-05-1-SB were selected as laboratory duplicates for alkalinity, and WK-05-1A and LL-05-1-SB were selected as laboratory duplicates for TDS analysis. Sample results were calculated to return a 'relative percent difference' (RPD) value among the field duplicate and laboratory duplicate pairs, which are created to meet an acceptance range of 20% for waters. The total fraction results for the field duplicate pairs and the laboratory duplicates were within limits, with the exception of Ra-226, as stated above.

Holding times and method blanks were evaluated and found to be within acceptable limits. Serial dilution results for those metal analytes greater than 50 times the method detection limit were within acceptable recovery limits with the exception of the Mg result noted above.

Matrix spike and matrix spike duplicate recovery were within acceptable recovery limits for all analytes, and the RPD between the MS/MSD recoveries were also acceptable. Sample WK-05-1A was selected for MS/MSD analysis for alkalinity, total fraction metals, and for total fraction Ra-226. All results met acceptance criteria.

The laboratory method blanks for total metals, Ra-226, and TDS analyses were non-detect. Sample 'Field Blank' was tested for metals, Ra-226, hardness, alkalinity and TDS associated with the groundwater sample set. There were no detected results for the parameters requested, with the exception of alkalinity analysis. Alkalinity was detected near the reporting limit (RL) in sample 'Field Blank'. However, associated hardness results for samples were all greater than the RL. Therefore, none of the associated sample results were qualified.

3.0 SUMMARY AND CONCLUSIONS

At White King, upgradient groundwater concentrations generally appear stable. Downgradient averages for arsenic and radionuclides have shown a slight but steady decrease since 2005. The average changes in concentrations at White King were not found to be statistically significant for both upgradient and downgradient groundwater.

At Lucky Lass, the uranium concentration in the upgradient well, which is greater than in downgradient wells, has decreased since 2005. Upgradient concentrations of Ra-226 appear stable, fluctuating around the MDA. In the prior monitoring report (Golder, 2009), attention was drawn to an apparent increasing trend in downgradient well 18A-S for uranium. However, the 2009 concentration for uranium in well 18A-S (0.66 µg/L) was lower than the 2008 concentration (2.3 µg/L) and similar to the 2007 concentration (0.6 µg/L). The average changes in Ra-226 and uranium concentrations at Lucky Lass were not found to be statistically significant for downgradient groundwater.

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TABLES

TABLE 1
White King Well Locations

Well ID	Northing	Easting
<u>Upgradient</u>		
12A-S	244939.19	4915339.17
12A-D	244937.77	4915333.31
16A	244541.33	4914638.95
<u>Downgradient</u>		
WK-05-1A	243180.62	4915893.16
WK-05-2A	243534.23	4916027.59
WK-05-3A	243829.81	4916088.91
WK-05-4A	24162.67	4916021.32
WK-05-1-SB	243174.81	4915907.97
WK-05-2-SB	243532.80	4916054.00
WK-05-3-SB	243841.15	4916110.17

TABLE 2
Lucky Lass Well Locations

Well ID	Northing	Easting
<u>Upgradient</u>		
LL-05-1-SB	243819.72	4910540.87
<u>Downgradient</u>		
LL-05-1A	244155.96	4911289.60
6A-S	244499.52	4910715.10
6A-D	244508.66	4910716.63
18A-S	244457.08	4911041.68
18A-D	244419.63	4911083.50

TABLE 3
White King Groundwater Analytical Results

Well ID	Date Sampled	Lab Report	Field Measurements			Physical Tests			Metals (total)			Radionuclides (total)			
			pH (a.u.)	Conductivity (S/m)	Temperature (°C)	Total Dissolved Solids (mg/L)	Alkalinity (mg/L as CaCO ₃)	Hardness (mg/L as CaCO ₃)	Calcium (ug/L)	Magnesium (ug/L)	Arsenic * (ug/L)	Ra-226 (pCi/L)	U-235 (ug/L)	U-238 (ug/L)	U-nat (ug/L)
Upgradient Wells															
12A-S	10/21/2005	148733	5.8	0.125	10.6	121	NA	38.9	9,650	3,590	2.34	<0.419	<0.01	<0.05	<0.05
	10/24/05	148972													
	5/30/2006	164282 164283	5.6	9	6.1	109	33.8	25.4	6,800	2,040	<1.5	<0.388	<0.01	0.123	0.124
	9/18/2007	194233 194590 194603													
	10/6/2008	217288 217358	6.76	11.9	13.7	106	55.5	37.4	9,350	3,410	2.6	<0.381	<0.01	0.125	0.125
	9/21/2009	237826													
12A-D	10/21/2005	148733 148972	6.48	0.14	9.3	140	58.1	49	11,100	5,140	2.25	<0.381	<0.01	0.058	0.059
	5/30/2006	164282 164283													
	9/18/2007	194233 194590 194603	6.53	8.4	10.4	120	65.4	48.4	10,800	5,190	4.2	<0.426	<0.01	0.082	0.082
	10/6/2008	217288 217358													
	9/21/2009	237826	6.4	NA	9.5	118	69.2	45.1	10,300	4,710	1.65	0.406	<0.01	0.09	0.09
	2005	NA													
16A	5/30/2006	164282 164283	8.3	10	9.0	132	85.9	59	16,700	4,220	3.06	0.452	<0.01	0.145	0.146
	9/19/2007	194233 194590 194603													
	10/6/2008	217288 217358	6.89	14.8	13.3	114	75.9	56.4	15,400	4,360	3.0	0.558	<0.01	0.97	0.97
	9/22/2009	237826													
			6.49	NA	13.1	103	63.4	43.9	12,400	3,130	<1.6	0.45	<0.01	0.078	0.078

TABLE 3
White King Groundwater Analytical Results

Well ID	Date Sampled	Lab Report	Field Measurements			Physical Tests			Metals (total)			Radionuclides (total)			
			pH (s.u.)	Conductivity (S/m)	Temperature (°C)	Total Dissolved Solids (mg/L)	Alkalinity (mg/L as CaCO ₃)	Hardness (mg/L as CaCO ₃)	Calcium (mg/L)	Magnesium (mg/L)	Arsenic * (mg/L)	Ra-226 (pCi/L)	U-235 (mg/L)	U-238 (mg/L)	U-rat (mg/L)
Downgradient Wells															
WK-05-1-A	10/23/2005	148982 148972	6.6	0.263	8.7	200	51.5	79.7	19,700	7,390	3.16	<0.365	0.018	2.59	2.61
	5/31/2006	164282 164283	6.7	22	10.6	185	75.7	68.1	16,500	6,510	4.09	0.514	0.035	5.84	5.88
	9/18/2007	194233 194590 194603	6.85	13.8	13.5	180	79.7	74.7	17,800	7,350	7.74	0.645	0.033	4.69	4.7
	10/6/2008	217288 217358	6.79	25.6	12.6	198	66.5	81.1	19,500	7,800	4.2	<0.411	0.022	3.70	3.70
	9/21/2009	237826	6.5	NA	13.8	199	81.3	69.0	16,100	6,980	5.19	<0.308	<0.01	3.84	3.87
WK-05-1-SB	10/23/2005	148962 148972	7.36	0.257	11.3	150	75.8	79	17,000	8,880	5.17	1.75	<0.01	0.363	0.366
	5/31/2006	164282 164283	6.8	24	11.7	195	83.9	80.4	17,300	9,030	4.23	0.408	<0.01	0.316	0.318
	9/18/2007	194233 194590 194603	7.03	14.9	12.3	196	88.4	83.1	18,100	9,200	4.16	0.684	<0.01	0.208	0.209
	10/6/2008	217288 217358	6.76	23.7	12.4	185	87.4	86.3	18,600	9,650	5.2	0.269	<0.01	0.19	0.19
	9/21/2009	237826	6.78	NA	12.8	157	90.3	79	17,000	8,900	4.29	0.956	<0.01	0.172	0.172
WK-05-2-A	10/27/2005	149142 149144	6.59	1.32	8.0	1,100	161	633	148,000	63,700	1.73	0.65	0.135	19.3	19.4
	5/31/2006	164282 164283	6.4	0.15	7.3	1,100	163	688	161,000	69,500	<1.5	0.689	0.114	18.3	18.4
	9/18/2007	194233 194590 194604	6.54	86.7	11.0	1,120	59.2	676	162,000	66,200	<1.5	0.686	0.035	4.9	4.94
	10/6/2008	217288 217358	6.71	0.187	10.2	1,410	149	1010	243,000	96,500	<1.5	<0.454	0.031	4.7	4.7
	9/21/2009	237826	6.18	NA	11.0	1,500	132	929	220,000	92,100	2.03	0.185	0.025	4.03	4.06
WK-05-2-SB	10/27/2005	149142 149144	7.22	0.277	7.2	180	127	642	151,000	64,500	1.55	0.39	0.138	19.4	19.6
	5/31/2006	164282 164283	6.6	31	9.1	216	138	105	22,000	12,200	2.42	<0.327	0.041	6.72	6.76
	9/18/2007	194233 194590 194605	7.05	19.1	9.8	210	138	92.9	19,600	10,700	1.99	<0.474	0.014	1.96	1.98
	10/6/2008	217288 217358	6.69	30.6	9.7	203	138	104	22,100	11,800	4	<0.371	0.012	2.00	2.00
	9/21/2009	237826	6.75	NA	10.4	208	136	86.5	18,300	9,920	2.25	<0.259	0.011	1.66	1.67
WK-05-3-A	10/28/2005	149142 149144	7.26	1.47	8.1	1,190	240	673	148,000	73,900	<1.5	<0.489	0.049	7.19	7.24
	5/31/2006	164282 164283	6.5	0.19	8.2	1,380	205	676	155,000	70,300	1.55	0.613	0.03	4.78	4.81
	9/18/2007	194233 194590 194605	6.77	0.112	13.6	1,340	221	575	131,000	60,400	<1.5	<0.417	0.022	3.08	3.1
	10/6/2008	217288 217358	6.51	0.18	12.1	1,340	194	753	169,000	80,400	<1.5	0.557	0.018	2.70	2.80
	9/21/2009	237826	6.28	NA	14.9	1,430	193	797	177,000	85,900	<1.6	<0.435	0.017	2.68	2.7
WK-05-3-SB	10/23/2005	148962 148733 148734	7.29	0.785	9.2	506	109	306	70,800	31,400	6.51	<0.399	<0.01	1.29	1.3
	5/31/2006	164282 164283	6.6	91	10.5	10	116	333	74,100	35,800	7.3	<0.477	<0.01	1.03	1.04
	9/18/2007	194233 194590 194605	6.91	66.4	10.9	823	119	500	107,000	56,700	4.32	0.557	<0.01	0.776	0.782
	10/6/2008	217288 217358	6.7	0.127	10.5	888	125	572	123,000	64,500	3	<0.368	<0.01	1.00	1.00
	9/21/2009	237826	6.53	NA	11.8	947	136	591	128,000	66,100	3.53	<0.333	<0.01	1.20	1.20
WK-05-4-A	10/28/2005	149142 149144	6.84	1.89	7.7	1,510	243	939	201,000	106,000	20.9	0.469	0.059	8.53	8.59
	5/30/2006	164282 164283	6.6	0.18	8.8	1,420	233	848	186,000	93,200	3.4	<0.389	0.057	9.36	9.42
	9/19/2007	194233 194590 194605	6.9	0.13	8.5	210	226	806	170,000	92,900	2.01	<0.460	0.039	5.75	5.79
	10/6/2008	217288 217358	6.74	0.214	11.2	1,490	264	1140	244,000	129,000	<1.5	0.594	0.057	8.7	8.8
	9/21/2009	237826	6.51	NA	12.4	1,600	302	950	193,000	114,000	<1.6	<0.441	0.039	6.35	6.39

NOTES:

* Many arsenic values reported by laboratory affected by arsenic detected in blanks, as discussed in data validation report for the year analyzed.

NA = Not Analyzed

Italics = Values are laboratory estimates, less than the practical quantitation limit (PQL).

TABLE 4
White King Groundwater Statistical Summary

	Total Metals				
	Arsenic (ug/L)	Ra-226 (pCi/L)	U-235 (ug/L)	U-238 (ug/L)	U-nat (ug/L)
Upgradient					
2005 Average Concentration	2.3	0.40	<0.01	0.05	0.05
2006 Average Concentration	2.2	0.43	<0.01	0.13	0.13
2007 Average Concentration	4.5	1.75	<0.01	0.11	0.11
2008 Average Concentration	2.4	0.45	<0.01	0.41	0.41
2009 Average Concentration	1.9	0.50	<0.01	0.11	0.11
Statistically Significant Increase 2005 to 2009	No	No	No	No	No
Statistically Significant Increase 2008 to 2009	No	No	No	No	No
Downgradient					
2005 Average Concentration	5.8	0.64	0.06	8.4	8.4
2006 Average Concentration	3.5	0.49	0.04	6.6	6.7
2007 Average Concentration	3.3	0.56	0.02	3.1	3.1
2008 Average Concentration	3.0	0.43	0.02	3.3	3.3
2009 Average Concentration	2.9	0.42	0.02	2.8	2.9
Statistically Significant Increase 2005 to 2009	No	No	No	No	No
Statistically Significant Increase 2008 to 2009	No	No	No	No	No

NOTES:

Averages used MDL (or MDA) for non-detects.

Where all values < MDL (or MDA), averages reported as "< MDL".

Mann-Whitney test used to determine statistical significance

TABLE 5
Lucky Lass Groundwater Analytical Results

Well ID	Date Sampled	Lab Report	Field Measurements			Physical Tests			Metals (total)		Radionuclides (total)			
			pH (a.u.)	Conductivity (S/m)	Temperature (°C)	Total Dissolved Solids (mg/L)	Alkalinity (mg/L as CaCO ₃)	Hardness (mg/L as CaCO ₃)	Calcium (mg/L)	Magnesium (mg/L)	Ra-226 (pCi/L)	U-235 (mg/L)	U-238 (mg/L)	U-net (mg/L)
Upgradient														
LL-05-1-SB	10/28/2005	149142 149144	8.14	0.589	6.9	329	261	200	54,300	15,500	0.322	0.053	7.56	7.61
	5/31/2006	164282 164283	7.10	52	9.6	379	379	265	73,900	19,700	0.544	0.035	5.7	5.74
	9/19/2007	194233 194590 194603	6.87	28.4	7.4	350	247	219	59,500	17,100	<0.354	<0.01	1.14	1.15
	10/6/2008	217288 217358	6.74	46.5	9.0	340	235	213	55,300	18,100	<0.340	<0.01	1.1	1.1
	9/21/2009	237826	6.74	NA	8.2	331	240	166	42,800	14,300	0.428	<0.01	0.974	0.974
	Downgradient													
6A-S	10/26/2005	148962 148972	6.60	0.295	7.6	201	129	67.1	18,300	5,190	<0.38	<0.01	<0.05	<0.05
	5/30/2006	164282 164283	6.50	19	8.1	176	102	55.7	15,200	4,310	<0.326	<0.01	0.108	0.109
	9/19/2007	194233 194590 194603	7.03	17.9	10.8	168	130	67.1	18,300	5,220	<0.281	<0.01	0.104	0.105
	10/6/2008	217288 217358	6.65	22	11.0	166	113	51.9	14,000	4,120	<0.364	<0.01	0.088	0.088
	9/22/2009	237826	6.68	NA	11.8	159	112	42.5	11,600	3,300	0.463	<0.01	0.106	0.106
	10/26/2005	149142 149144	7.21	0.237	8.3	150	106	70.9	16,500	7,210	<0.423	<0.01	0.376	0.379
18A-S	5/30/2006	164282 164283	6.50	19	7.0	176	98.2	65.9	15,200	6,800	<0.423	<0.01	0.396	0.398
	9/19/2007	194233 194590 194603	7.00	15.3	11.6	189	126	93.3	21,700	9,530	0.535	<0.01	0.60	0.605
	10/6/2008	217288 217358	6.69	22.3	11.1	193	130	102	23,800	10,400	<0.414	0.014	2.31	2.33
	9/22/2009	237826	6.73	NA	12.3	174	116	73.9	17,400	7,420	0.676	<0.01	0.657	0.657
	10/27/2005	149142 149145	6.87	0.122	6.7	120	55.6	33.1	8,230	3,040	<0.385	<0.01	0.12	0.121
	5/30/2006	164282 164283	5.60	11	5.8	123	56.3	33.9	8,380	3,160	0.503	<0.01	0.091	0.092
LL-05-1A	9/19/2007	194233 194590 194603	6.76	7.3	7.7	116	55.7	33.3	8,060	3,190	0.507	<0.01	0.087	0.088
	10/6/2008	217288 217358	6.74	11.7	8.4	114	56	31.3	7,760	2,890	<0.373	<0.01	0.078	0.078
	9/22/2009	237826	6.42	NA	8.2	119	56.5	31.3	7,990	2,950	0.362	<0.01	0.105	0.105

NOTES:

Arsenic is not a constituent of concern (COC) for Lucky Lass.

NA = Not Analyzed

Italics = Values are laboratory estimates, less than the practical quantitation limit (PQL).

TABLE 6
Lucky Lass Groundwater Statistical Summary

	Total Metals			
	Ra-226 (pCi/L)	U-235 (ug/L)	U-238 (ug/L)	U-nat (ug/L)
Upgradient				
2005 Concentration	0.322	0.053	7.56	7.61
2006 Concentration	0.554	0.035	5.7	5.74
2007 Concentration	<0.354	<0.01	1.14	1.15
2008 Concentration	<0.34	<0.01	1.1	1.1
2009 Concentration	0.43	<0.01	0.97	0.97
Downgradient				
2005 Average Concentration	0.40	<0.01	0.18	0.18
2006 Average Concentration	0.42	<0.01	0.20	0.20
2007 Average Concentration	0.44	<0.01	0.26	0.27
2008 Average Concentration	0.38	0.011	0.83	0.83
2009 Average Concentration	0.50	<0.01	0.29	0.29
Statistically Significant Increase 2005 to 2009	No	No	No	No
Statistically Significant Increase 2008 to 2009	No	No	No	No

NOTES:

Arsenic is not a constituent of concern (COC) for Lucky Lass.

Averages used MDL (or MDA) for non-detects.

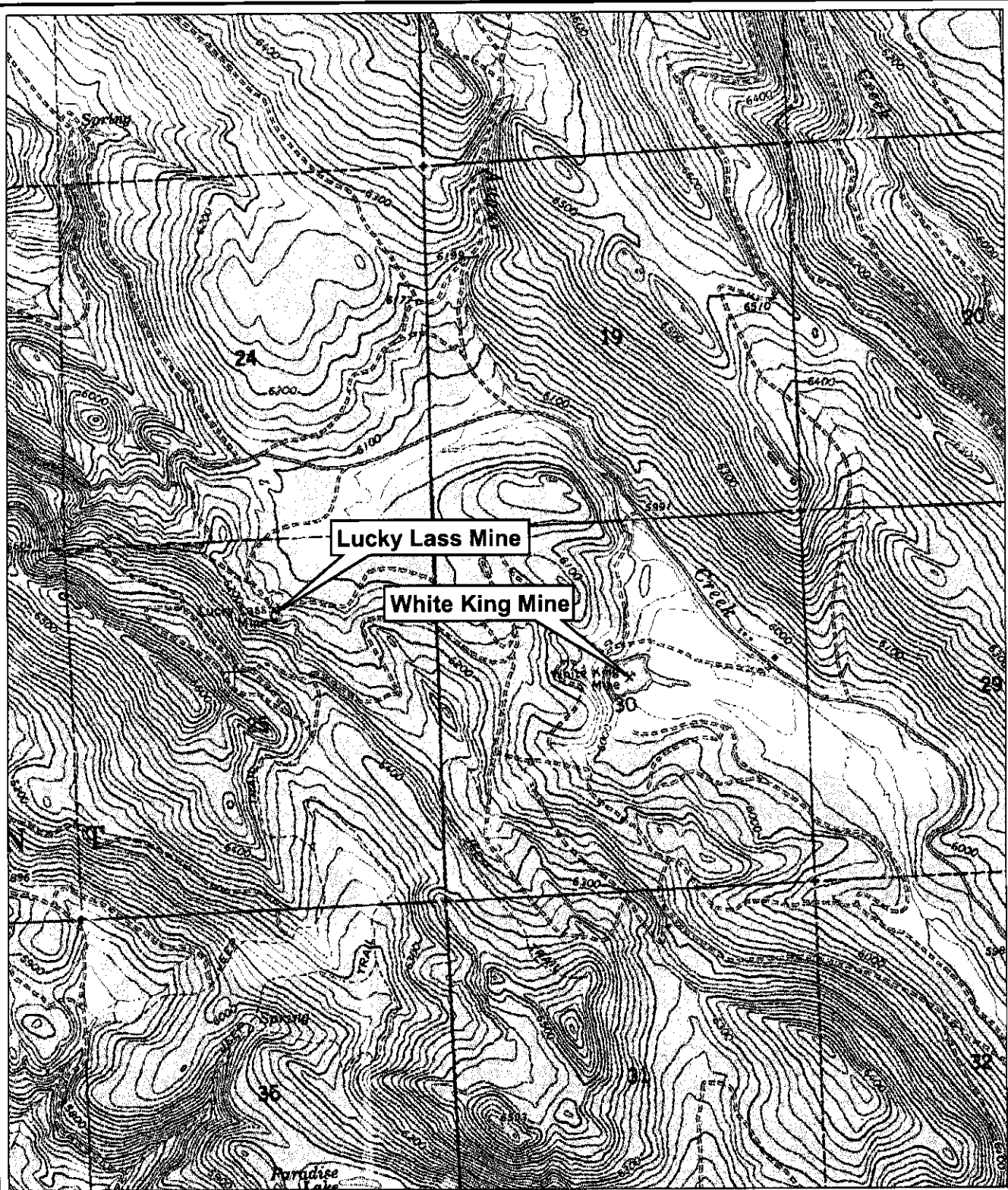
Where all values < MDL (or MDA), averages reported as "< MDL".

Mann-Whitney test used to determine statistical significance

Upstream year-to-year statistical comparison not possible with only one sampling point.

* See text discussion.

FIGURES

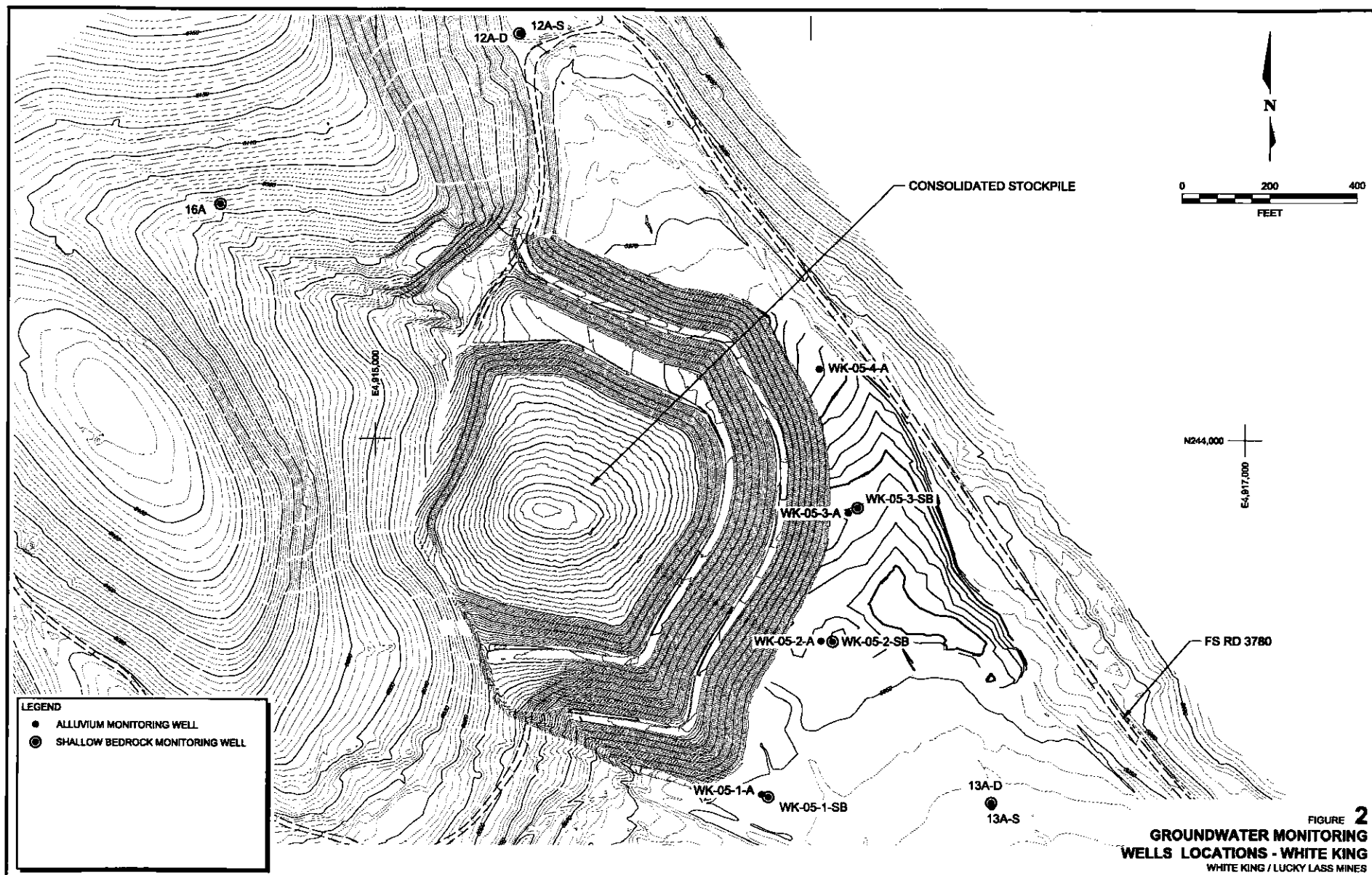


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SCALE IN FEET



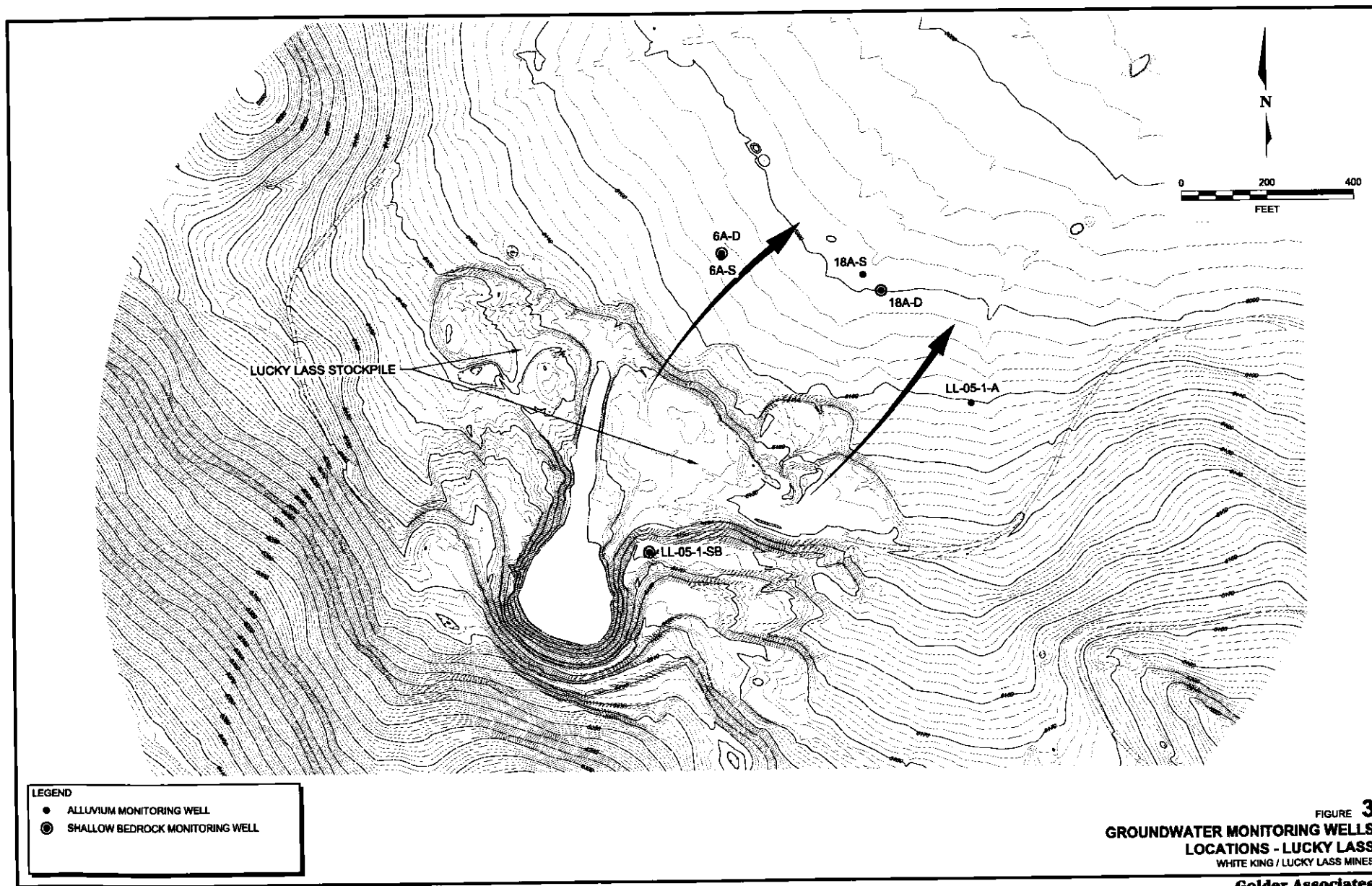
Source: USGS 7.5 Minute Topographic Quadrangle Map,
Cox Flat, OR, 1980

FIGURE 1
VICINITY MAP
TLWHITE KING LUCKY LASS MINES/OR



K:\CAD\Projects\2007\0331396\001\B300\Groundwater Monitoring-WK 05-21-06.dwg | Figure 2 | Mod: 05/21/2008, 14:59 | Plotted: 05/21/2008, 15:09 | d:\b300

Golder Associates



Attachment 3: SITE INSPECTION FORM

**White King - Lucky Lass Mines Super Fund Site
ANNUAL INSPECTION CHECKLIST**

Item No.	Inspection Item	Inspector	Date	Photo. No.	Overall Condition G/F/P	Deteriation Observed N/Y	Severity 0/1/2	Comments
White King Mine Site - Map 1								
1	White King Entrance Gate	W.Yee	5/28/2009		F	N		
2	Wetland Gate from FR 3780	"	"		G	N		
	Gate, Lock & Sign	"	"		F	N		
3	Augur Creek in WK Meadow	"	"		G	N		
4	Augur Creek from White King Pond	"	"		G	N		
5	Augur Creek to natural channel	"	"		G	N		
6	Wetland 5934 Spillway	"	"		F	Y	0	Slight damage by cattle from 2008
7	Wetland 5931 Spillway	"	"		F	Y	0	"
8	Wetland 5927 Spillway	"	"		F	Y	0	"
9	Pond Spillway & Berm	"	"		G	N		
White King Stockpile - Map 2								
1	Stockpile	"	"					
	Vegetation Cover	"	"		G	N		Increase in Cover Vegetation
	Erosion	"	"		F	N	0	Very little increase in visible erosion from 2008
	Settlement	"	"		G	N	0	
2	Stormwater Ditches	"	"		F	N	1	Westside slumping to be corrected this summer
3	Fencing	"	"		F	N	0	FS maintained Exterior, added new interior fencing
4	Warning Signs	"	"		F	N		Could use more sinage on ext. fence
5	Gates & Locks	"	"		G	N		
6	Monitoring Wells (12 Total)	"	"		G	N		
Lucky Lass Mine Site - Map 3								
1	Lucky Lass Stockpile							
	Vegetation	"	"		G	N		
	Erosion	"	"		G	N		
	Settlement	"	"		F	N	0	
2	Stormwater Ditches	"	"		F	N	0	
3	Pond Outlet Channel	"	"		G	N		
4	Fencing	"	"		F	N	0	
5	Warning Signs	"	"		F	N	0	
6	Gates & Locks	"	"		G	N		
7	Monitoring Wells (6 total)	"	"		G	N		
Notes/Comments								
G = Good F = Fair P = Poor 0 = none to little 1 = moderate 2 = high								

**WHITE KING - LUCKY LASS SUPERFUND SITE
ANNUAL INSPECTION CHECKLIST**

White King Mine Site - Map 1

No.	Inspection item
1	White King Entrance Gate
2	Wetland Gate from FR 3780 (Gate, Lock & Sign)
3	Augur Creek in WK Meadow
4	Augur Creek from White King Pond
5	White King Pond Spillway
6	Wetland 5934 Spillway
7	Wetland 5931 Spillway
8	Wetland 5927 Spillway
9	Augur Creek discharge to natural channel

**WHITE KING - LUCKY LASS SUPERFUND SITE
ANNUAL INSCECTION CHECKLIST**

ANNUAL INSPECTION CHECKLIST

No.	Inspection item
1	White King Stockpile Vegetation Erosion Settlement
2	Stormwater Ditches
3	Fencing
4	Gates & Locks
5	Warning Signs
6	Monitoring Wells (13 Total)

WHITE KING - LUCKY LASS SUPERFUND SITE

ANNUAL INSPECTION ITEMS

Lucky Lass Mine Site - Map 3

No.	Inspection item
1	Lucky Lass Stockpile Vegetation Erosion Settlement
2	Stormwater Ditches
3	Lucky Lass Outlet Channel
4	Fencing
5	Gates & Locks
6	Warning Signs
7	Monitoring Wells (6 total)

Attachment 4: Title Search

AMERITITLE
405 FIRST STREET NORTH
LAKEVIEW OR 97630
541-947-3019

CUSTOMER #: 000618

ATTN:
RUSS JONES

00000

DATE: 12/28/09

INVOICE: 0010807

TITLE #: 0010425

CUSTOMER REF: FREMONT LUMBER

ESCROW #:

ESCROW OFFICER: HOUSE

PRELIMINARY TITLE REPORT

.00 200.00

TOTAL: 200.00



RUSS JONES

Date: December 28, 2009

Title Number: 0010425

Title Examiner: JUNE LIGHTLE

**PRELIMINARY TITLE REPORT FOR:
FREMONT LUMBER COMPANY****REPORT NO. 1****Policy or Policies to be issued:
PRELIMINARY TITLE REPORT****Liability****Premium****\$ 200.00**

We are prepared to issue ALTA (6-17-2006), title insurance policy(ies) of Chicago Title Insurance Company of Oregon in the form and amounts above, insuring the title to the land described as follows:

PLEASE SEE ATTACHED EXHIBIT "A"

And dated as of December 24, 2009 at 8:00 A.M., title is vested in:

**FREMONT LUMBER COMPANY,
A NEVADA CORPORATION**

The estate or interest in the land described or referred to in this Commitment and covered herein is:

FEE SIMPLE

This report is preliminary to the issuance of title insurance and shall become null and void unless a policy is issued and the full premium therefore paid.

Schedule B of the policy(ies) to be issued will contain the following general and special exceptions unless removed prior to issuance:

GENERAL EXCEPTIONS:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.
5. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.
6. Unpatented mining claims whether or not shown by the public records.

SPECIAL EXCEPTIONS:

7. Reservations or exceptions in patents or in Acts authorizing the issuance thereof, including but not limited to those disclosed by document recorded February 12, 1985, in Book 9 at page 554, Lake County Deed Records, Oregon.
8. Rights incident to the use of any existing power, telephone lines that may cross the property and the rights of the public in public roads that may cross and/or border said property.
9. The assessment roll and the tax roll disclose that the premises herein described have been specially assessed as Forest Land Assessment. If the land becomes disqualified for the special assessment under the statute, an additional tax may be levied; in addition thereto a penalty may be levied if notice of disqualification is not timely given..
10. An outstanding interest in Fremont Lumber Company, a corporation, as successor in interest to E.T. Dusenbury, in and to all of the timber for a period of 99 years, subject to the terms and provisions of that certain instrument recorded January 23, 1931, in Book 73 at page 136 and in Book 73 at Page 142, Lake County Deed Records, Oregon. (Affects Parcels 1, 3 & 4)
11. Easement, in favor of the United States of America, acting by and through the Forest Service, U.S.D.A. and assigns, for rights of way for roadway and telephone and electrical transmission lines, under the terms and provisions of that certain instrument executed by Walter H. Leehmann and Edith Leehmann and recorded in Book 114 at Page 64, Lake County Deed Records, Oregon. (Affects Parcel 1)

12. An outstanding interest in Mearle H. Leehmann and Dorothy L. Leehmann, husband and wife; Walter H. Leehmann, Jr. and Jean Leehmann, husband and wife; Caryl Coppin and Cleve Coppin, husband and wife; and W. H. Leehmann, as their interests may appear, in and to right to gas, oil, coal, minerals and uranium, in or under that portion of the herein described property, under those certain deeds, including the terms and provisions thereof, recorded in Book 120 at page 39; Book 122 at Page 361, Lake County Deed Records, Oregon.

By instrument dated August 10, 1964 and recorded October 1, 1964, in Book 140 at Page 145, Lake County Deed Records, Oregon, the above named parties consented to and subordinated their rights in a right of way in favor of Fremont Lumber Company, a corporation and its successors and assigns.

The above interest was subordinated to the interest of the United States of America, under easement recorded in Book 204 at Page 269, Lake County Deed Records, Oregon, by Consent and Subordination agreement, recorded February 13, 1987, in Book 206 at Page 318, Lake County Deed Records, Oregon.

The above interest was subordinated to the interest of the United States of America, under easement, recorded in Book 204 at Page 269, Lake County Deed Records, Oregon, by Consent and Subordination Agreement, recorded February 13, 1987, in Book 206 at Page 324, Lake County Deed Records, Oregon.

13. An outstanding interest in Mearle H. Leehmann and Dorothy L. Leehmann, husband and wife, in and to the gas, oil, coal, minerals and uranium as reserved under that certain deed, including the terms and provisions thereof, recorded in Book 136 at Page 278, Lake County Deed Records, Oregon.

Note: The mineral interest reserved or excepted above has not been followed out and subsequent transactions affecting said interest or taxes levied against same are not reflected in this title evidence.

14. Rights, duties and obligations of Fremont Lumber company, a corporation and Lakeview Logging Company, a corporation, their successors or assigns, under that certain instrument, including the terms and provisions thereof, executed in favor of the United States of American, dated October 19, 1964 and recorded October 19, 1964, in Book 140 at Page 268, Lake County Deed Records, Oregon. (Affects Parcels 3 & 4)
15. Interest of persons other than the above named record owners in and to all of the above described property under unrecorded contracts, leases, options or mining claims as disclosed by reference in those certain instruments recorded in Book 10 at Page 311, Lake County Record of Mining Claims, by memorandum of lease recorded in Book 121 at Page 385, Lake County Deed Records, Oregon. (Affects Parcel 2)
16. Easement and Equitable Servitude, Fremont Lumber Company, Grantor and the Oregon Department of Environmental Quality, Grantee including the terms and provisions thereof, as contained in instrument,
Recorded: April 2, 2007
Book 269 at Page 737, Lake County Deed Records, Oregon.

17. We are unable to ascertain from the records if the premises herein described have a means of ingress and egress to and from a legally dedicated road or highway, therefore, Notwithstanding Paragraph 4 of the insuring clauses of the policy, the policy will not insure against loss arising by reason of any lack of a right of access to and from the land.

End of Exceptions

NOTE A: Any map or sketch enclosed as an attachment herewith is furnished for information purposes only to assist in property location with reference to streets and other parcels. No representation is made as to accuracy and the company(ies) assume no liability for any loss occurring by reason of reliance thereon.

NOTE B: This report does not include a search for financing statements filed in the office of the Secretary of State, in this or any other state, and no liability is assumed if a financing statement is filed in the office of the County Clerk covering timber on the premises wherein the lands are described other than by metes and bounds or under the rectangular survey system.

NOTE C: Taxes for fiscal year 2009-2010, paid.

Account No.: 18118
Amount: \$122.32

Map No.: 3718-301
Code No.: 702

Taxes for fiscal year 2009-2010, paid.

Account No.: 18119
Amount: \$78.65

Map No.: 3719-301
Code No.: 702

Taxes for fiscal year 2009-2010, paid.

Account No.: 10297
Amount: \$72.51

Map No.: 3719-1000
Code No.: 702

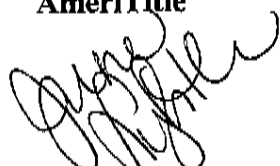
Taxes for fiscal year 2009-2010, paid.

Account No.: 10298
Amount: \$395.90

Map No.: 3719-1100
Code No.: 702

NOTE D: We find no judgments, state and/or federal tax liens on Fremont Lumber Company, a Nevada Corporation.

AmeriTitle



By: JUNE LIGHTLE
Title Examiner

END

MISSION STATEMENT

"Superior Service with Commitment and Respect for Customers and Employees"

EXHIBIT "A"
LEGAL DESCRIPTION

In the County of Lake, State of Oregon, as follows:

Parcel 1

**Township 37 South, Range 18 East of the Willamette Meridian,
Section 24: The S½ of the SE¼.**

Parcel 2

**Township 37 South, Range 19 East of the Willamette Meridian,
Section 19: Government Lot 4.**

Parcel 3

**Township 37 South, Range 19 East of the Willamette Meridian,
Section 29: The NW¼ of the SW¼.
Section 30: The NE¼ of the SE¼.**

Parcel 4

**Township 37 South, Range 19 East of the Willamette Meridian,
Section 32: The NW¼ of the NE¼;
 The S½ of the NE¼;
 The E½ of the NW¼**

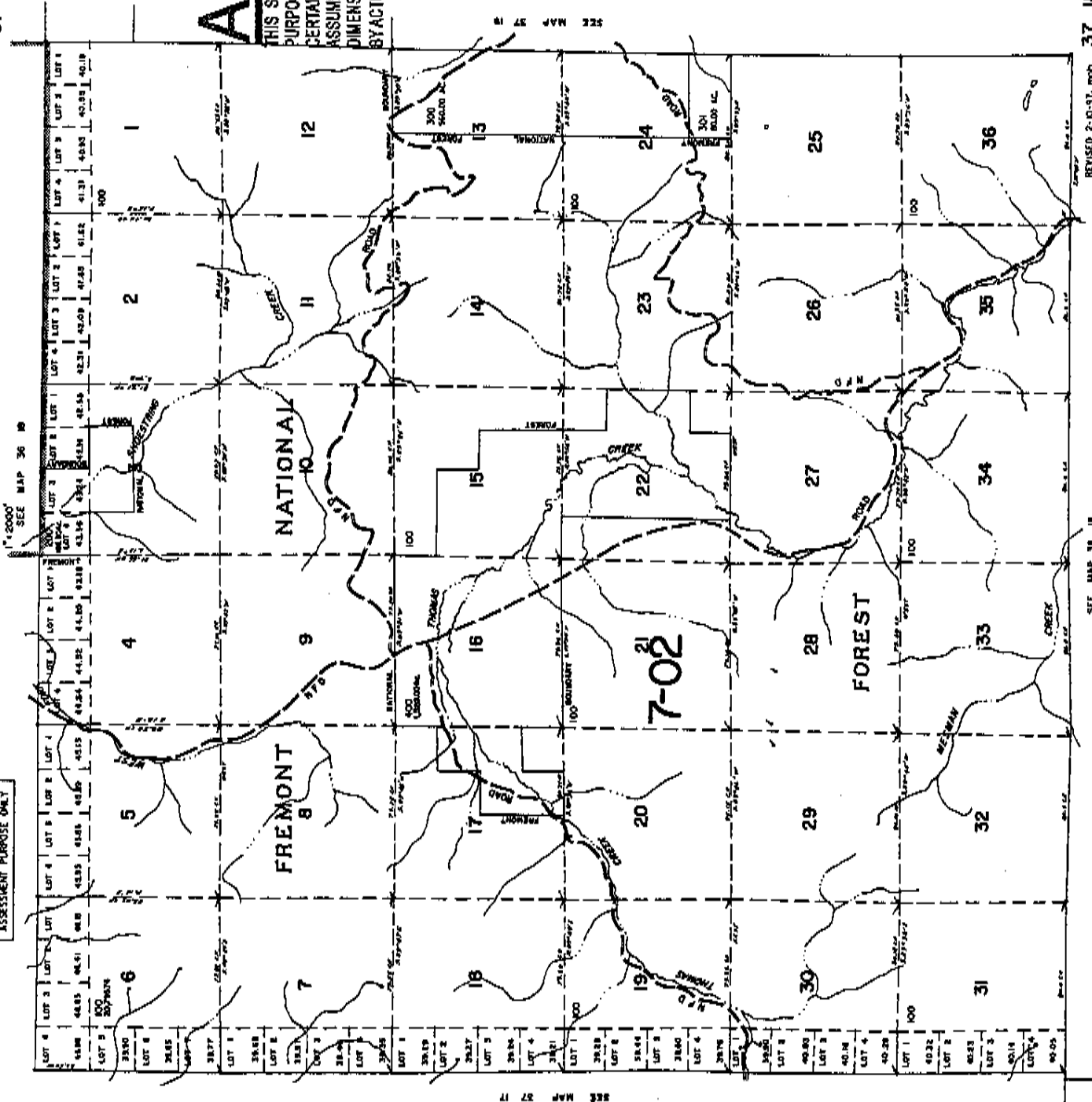
AmeriTitle

THIS SKETCH IS MADE SOLELY FOR THE PURPOSE OF ASSISTING IN LOCATING CERTAIN PREMISES AND NO LIABILITY IS ASSUMED FOR VARIATIONS IF ANY, IN DIMENSIONS AND LOCATIONS ASCERTAINED BY ACTUAL SURVEY.

T.37S. R.18E. W.M.
LAKE COUNTY

THIS MAP WAS PREPARED FOR
ASSESSMENT PURPOSE ONLY

37 18



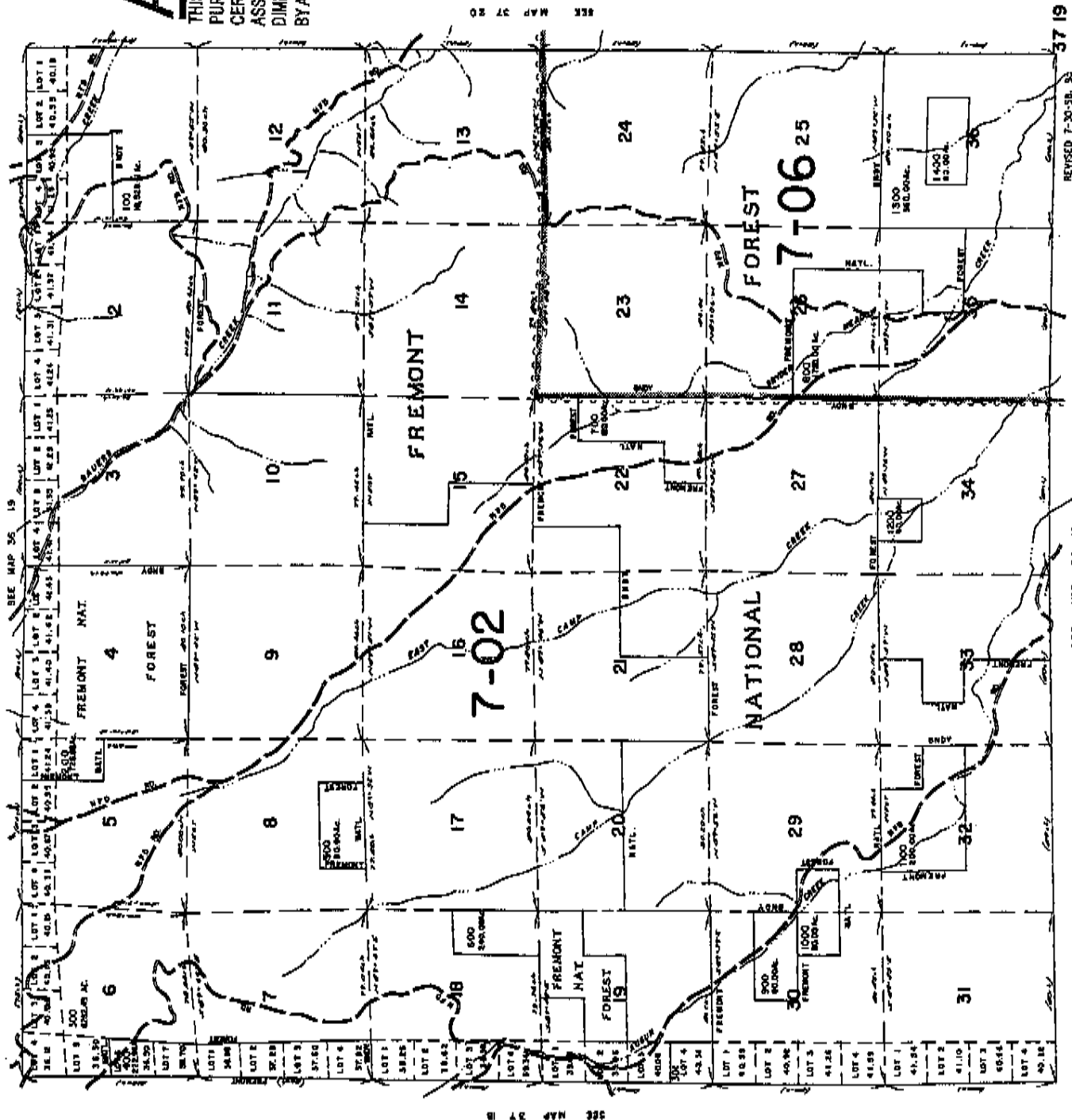
REVISED 2-10-97, mch

SEE MAP 36 18

T37S R9E W.M.
LAKE COUNTY
1"=2000'

THIS MAP WAS PREPARED FOR
ASSESSMENT PURPOSE ONLY

37 19



37 19

SEE MAP 38 19

AMERITITLE
405 FIRST STREET NORTH
LAKEVIEW OR 97630
541-947-3019

CUSTOMER #: 000618

ATTN:
RUSS JONES

00000

DATE: 12/28/09

INVOICE: 0010808

TITLE #: 0010426

CUSTOMER REF: COPPIN

ESCROW #:

ESCROW OFFICER: HOUSE

PRELIMINARY TITLE REPORT

.00 200.00

TOTAL:

200.00



RUSS JONES

Date: December 28, 2009

Title Number: 0010426
Title Examiner: JUNE LIGHTLE**PRELIMINARY TITLE REPORT FOR:**
CLEVE W. COPPIN
CARYL M. COPPIN**REPORT NO. 1****Policy or Policies to be issued:**
PRELIMINARY TITLE REPORT**Liability****Premium****\$ 200.00**

We are prepared to issue ALTA (6-17-2006), title insurance policy(ies) of Chicago Title Insurance Company of Oregon in the form and amounts above, insuring the title to the land described as follows:

In the County of Lake, State of Oregon, as follows:

Township 37 South, Range 19 East of the Willamette Meridian,
Section 30: The S½ of the NE¼.

And dated as of December 24, 2009 at 8:00 A.M., title is vested in:

CLEVE W. COPPIN AND CARYL M. COPPIN, AS CO-TRUSTEES
OF THE CLEVE W. & CARYL M. COPPIN TRUST UNDER TRUST AGREEMENT
DATED JANUARY 23, 1992 AND THEIR SUBSTITUTES AND SUCCESSORS
AS TRUSTEE THEREUNDER

The estate or interest in the land described or referred to in this Commitment and covered herein is:

FEE SIMPLE

This report is preliminary to the issuance of title insurance and shall become null and void unless a policy is issued and the full premium therefore paid.

Schedule B of the policy(ies) to be issued will contain the following general and special exceptions unless removed prior to issuance:

GENERAL EXCEPTIONS:

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.
5. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.
6. Unpatented mining claims whether or not shown by the public records.

SPECIAL EXCEPTIONS:

7. Reservations or exceptions in patents or in Acts authorizing the issuance thereof.
8. Rights incident to the use of any existing power, telephone lines that may cross the property and the rights of the public in public roads that may cross and/or border said property.
9. The assessment roll and the tax roll disclose that the premises herein described have been specially assessed as Farm Use Land. If the land becomes disqualified for the special assessment under the statute, an additional tax may be levied; in addition thereto a penalty may be levied if notice of disqualification is not timely given.
10. The assessment roll and the tax roll disclose that the premises herein described have been specially assessed as Forest Land Assessment. If the land becomes disqualified for the special assessment under the statute, an additional tax may be levied; in addition thereto a penalty may be levied if notice of disqualification is not timely given..
11. An outstanding interest in E.T. Dusenbury, his heirs and assigns, in and to all of the timber for a period of 99 years, subject to the terms and provisions of that certain instrument, recorded in Book 73 at Page 139, Lake County Deed Records, Oregon.

12. An outstanding 1/9 interest in the oil, gas and minerals, in Caryl Coppin and Cleve Coppin, her husband, under the terms and provisions of that certain deed recorded in Book 120 at Page 39, Lake County Deed Records, Oregon.

The above interest was subordinated to the interest of the United States of America, under easement recorded in Book 204 at Page 269, Lake County Deed Records, Oregon, by Consent and Subordination agreement, recorded February 13, 1987, in Book 206 at Page 318, Lake County Deed Records, Oregon.

Note: The mineral interest reserved or excepted above has not been followed out and subsequent transactions affecting said interest or taxes levied against same are not reflected in this title evidence.

13. An outstanding 1/9 interest in the oil, gas and minerals, in Walter H. Leehmann, Jr. and Jean Leehmann, husband and wife, under the terms and provisions of that certain deed recorded in Book 122 at Page 361, Lake County Deed Records, Oregon.

The above interest was subordinated to the interest of the United States of America, under easement recorded in Book 204 at Page 269, Lake County Deed Records, Oregon, by Consent and Subordination agreement, recorded February 13, 1987, in Book 206 at Page 324, Lake County Deed Records, Oregon.

Note: The mineral interest reserved or excepted above has not been followed out and subsequent transactions affecting said interest or taxes levied against same are not reflected in this title evidence.

14. An outstanding interest in Mearle H. Leehmann and Dorothy L. Leehmann, husband and wife, in and to the oil, gas, coal, minerals and uranium, as reserved under that certain deed, including the terms and provisions thereof, recorded in Book 136 at page 278, Lake County Deed Records, Oregon.

Note: The mineral interest reserved or excepted above has not been followed out and subsequent transactions affecting said interest or taxes levied against same are not reflected in this title evidence.

15. Reservations and exceptions as set forth in that certain deed, including the terms and provisions thereof, recorded November 13, 1963, in Book 138 at Page 507, Lake County Deed Records, Oregon, wherein Kermac Nuclear Fuels Corp., was Grantor and Walter Leehmann, Sr., was Grantee.
16. Easement and right of way, created by instrument, including the terms and provisions thereof, executed in favor of the United States of America, recorded June 10, 1971, in Book 158 at Page 159, Lake County Deed Records, Oregon.

17. An outstanding interest in Douglas Walter Leehmann, Wayne Edward Leehmann, Robert Dale Leehmann, Janet Faye Leehmann, Judy Kay Leehmann, John Pl. Leehmann, Sherrill A. Smith, Mearle M. Leehmann, Donald Coppin, Michael Coppin and Susan Coppin, devisees under the Last Will & Testament of Walter H. Leehmann, Sr., Probate No. 1960 in the Circuit Court for Lake County, Oregon, for an undivided two-thirds interest in ALL subsurface rights to gas, oil, minerals and the right to remove the same.

The above interest was subordinated to the interest of the United States of America, under easement recorded in Book 204 at Page 269, Lake County Deed Records, Oregon, by Consent and Subordination agreement, recorded February 13, 1987, in Book 206 at Page 320, Book 206 at Page 322, Book 206 at Page 324, Lake County Deed Records, Oregon. Except the interest of John P. Leehmann, Sherrill A. Smith and Mearle M. Leehmann.

Note: The mineral interest reserved or excepted above has not been followed out and subsequent transactions affecting said interest or taxes levied against same are not reflected in this title evidence.

18. Terms and provisions of that certain instrument recorded June 24, 1986 in Book 204 at Page 269, Lake County Deed Records, Lake County, Oregon.
19. Easement and Equitable Servitude between The Coppin Family Trust, Grantor and the Oregon Department of Environmental Quality, Grantee, including the terms and provisions thereof, as disclosed by document recorded in Book 271 at page 34, Lake County Deed Records, Oregon.
20. We are unable to ascertain from the records if the premises herein described have a means of ingress and egress to and from a legally dedicated road or highway, therefore, Notwithstanding Paragraph 4 of the insuring clauses of the policy, the policy will not insure against loss arising by reason of any lack of a right of access to and from the land.

End of Exceptions

NOTE A: Any map or sketch enclosed as an attachment herewith is furnished for information purposes only to assist in property location with reference to streets and other parcels. No representation is made as to accuracy and the company(ies) assume no liability for any loss occurring by reason of reliance thereon.

NOTE B: This report does not include a search for financing statements filed in the office of the Secretary of State, in this or any other state, and no liability is assumed if a financing statement is filed in the office of the County Clerk covering timber on the premises wherein the lands are described other than by metes and bounds or under the rectangular survey system.

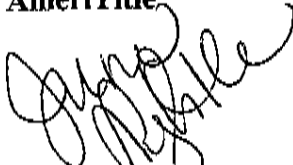
NOTE C: Taxes for fiscal year 2009-2010, paid.

Account No.: 10296
Amount: \$56.16

Map No.: 3919-900
Code No.: 702

NOTE D: We find no judgments, state and/or federal tax liens on Cleve W. Coppin and Caryl M. Coppin, Trustees.

AmeriTitle



By: JUNE LIGHTLE
Title Examiner

END

MISSION STATEMENT

"Superior Service with Commitment and Respect for Customers and Employees"

